

# hp·ux/usr

Hands-On Solutions for HP-UX Users • May 1995



**Building Programs from the Internet ■ Review: Z-Mail**  
**Networking Background for System Administrators, Part 1**

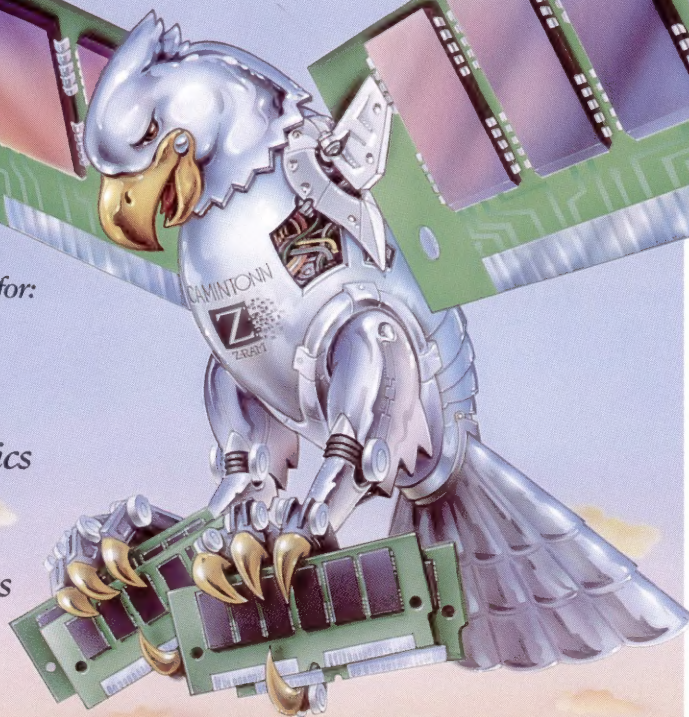
• A Publication of Interex • The International Association of Hewlett-Packard Computing Professionals

BULK RATE  
US Postage  
**PAID**  
Saratoga, MS  
Permit #30



# Camintonn/Z-RAM Memory Customers Come Back Again And Again.

Memory products for:  
*digital*  
**HP Apollo**  
**IBM RISC**  
**Silicon Graphics**  
**SUN**  
**PCs and**  
**Laser Printers**



Why would you leave the nest if you're well taken care of? Camintonn/Z-RAM customers come back again and again because of our 12-year record of proven leadership. Not just in high quality products, but also in prompt customer service, knowledgeable technical support, and a 24-hour repair-or-replace guarantee. Backed by a lifetime warranty.

And since Camintonn/Z-RAM has the broadest line of memory products available, manufactured and rigorously tested in the

## Because We Take Care Of You.

United States, the quality product you need is ready for immediate delivery. What's more, we're almost always the first to offer 100% compatible memory for the newest systems – often before they're available from the original manufacturers.

Guaranteed performance and a 12-year track record of growth and financial stability. That's a message worth repeating. Call us at 1-800-368-4726 for an immediate quote for your system.

**CAMINTONN**  
CORPORATION

The last word in memory

Tel: 800/368-4726 or 714/454-1500

Fax: 714/830-4726

U.K. Tel: 44/865-784747 • Fax: 44/865-784750

See Us At Interex Booth 433



## FREE

**Camintonn/Z-RAM Atlas**  
**Your Guide To The**  
**World Of Memory**

Fax this form back to us and we'll send you the Z-RAM Atlas – a \$49.95 value!

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
City/State/Zip \_\_\_\_\_  
Phone \_\_\_\_\_ Fax \_\_\_\_\_  
Which computer platforms are currently in use at your company? (check all that apply)  
DEC \_\_\_\_\_ SGI \_\_\_\_\_  
HP \_\_\_\_\_ SUN \_\_\_\_\_  
IBM \_\_\_\_\_ PC LANs \_\_\_\_\_

Camintonn/Z-RAM world headquarters located at 22 Morgan, Irvine, CA 92718-2202. European headquarters located at Oxford Science Park, OX4 4GA, U.K.  
©1994 Camintonn Corporation. Product and company names are trademarks or registered trademarks of their respective companies.

CIRCLE 45 ON READER SERVICE CARD



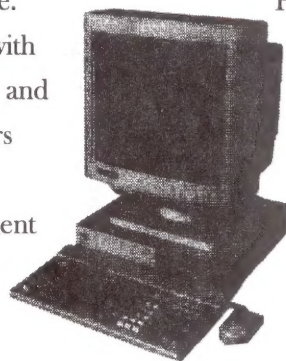
# HP WORKSTATION SPECIALISTS

ALL the PERFORMANCE at a  
FRACTION of the PRICE

**M**onterey Bay Communications is a vendor of remarketed Hewlett-Packard equipment. Since 1978, we have worked exclusively with HP products serving 1000 and 9000 users worldwide.

Our goal is to provide these users with reliable equipment that is functionally and cosmetically identical to what HP offers - and at substantial savings.

We do this within a sales environment that minimizes problems of configuration, shipping, installation and warranty.



Consider the following:

- Substantial savings on Hewlett-Packard workstations and peripherals.
- All equipment warranted and eligible for Hewlett-Packard maintenance.
- An extensive parts and spares inventory that assures prompt delivery - overnight if necessary.
- Knowledgeable service from a company that has been in business almost two decades.

For more information or a quotation please give us a call at:  
**408-429-6144.**

**MONTEREY BAY**  
C O M M U N I C A T I O N S

Monterey Bay Communications Inc., 1010 Fair Avenue, Santa Cruz, CA 95060 Tel: 408-429-6144 Fax: 408-429-1918



**FREE**  
CDE EVAL COPY  
NOW AVAILABLE FOR HP-UX9.\*



When was the last time 500,000  
people agreed on anything?

## TriTeal's Enterprise Desktop. Welcome to CDE.

Now Available for  
HP, IBM, SGI,  
Sun & X-Terms.

It's called the Common Desktop Environment (CDE), and for UNIX® systems everywhere, it's nothing short of revolutionary. By providing a single graphical interface across all UNIX platforms, CDE creates a common ground for users of every kind — and ushers in a whole new era of corporate computing freedom.

And now, with TriTeal Enterprise Desktop™ (TED), you can take the first steps into CDE. Starting with TriTeal's Visual User Environment™ (VUE 3.0), you'll enjoy the instant rewards of having one consistent, easy-to-use desktop. With an installed base that's more than half a million strong, VUE is not only a proven technology — it's also a core component of CDE. Which makes it easy to migrate from VUE 3.0 to TED, a definitive CDE product.

From login to logout, TED provides an intuitive, graphical display that lets you access applications, data and network services without knowing a thing about UNIX systems. Best of all, it comes from TriTeal, widely recognized as the leader in CDE technology.

In the heterogeneous world of UNIX systems, one desktop is giving everyone cause for celebration. TriTeal's Enterprise Desktop. **Call 1-800-TRITEAL for details about our 30-day evaluation program and the name of a reseller near you.**



**TriTeal Corporation**

Phone: (619) 930-2077

e-mail: [info@triteal.com](mailto:info@triteal.com)

World Wide Web: <http://www.triteal.com/>

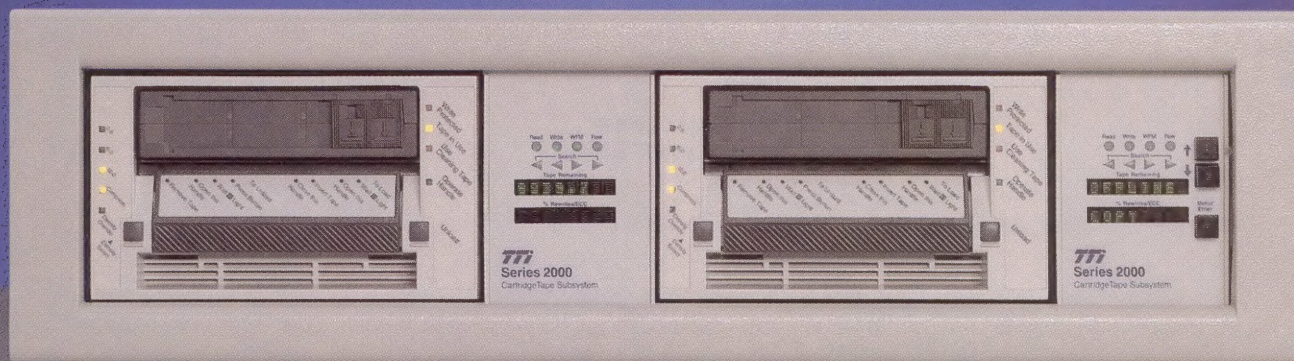
TriTeal Enterprise Desktop and TED are trademarks of TriTeal Corp. UNIX is a registered trademark in the U.S. and other countries, licensed exclusively through X/Open Co. Ltd. Visual User Environment and VUE are trademarks of Hewlett Packard. All other trademarks are the property of their respective owners.

Buy TED  
Get FAX Software  
**FREE**  
1.800.874.8325

CIRCLE 42 ON READER SERVICE CARD



# DLT Exclusive!



**Mirroring Mode**  
allows you to write the  
same data to both  
drives simultaneously.

**Off-line Copy**  
lets you copy the contents  
of one tape to another  
without host involvement.

**Cascade Mode**  
automatically writes data  
to the second tape when  
the first tape is full.

**Independent Mode**  
lets you operate each  
drive independently.

## Mirroring, cascading and off-line copy only in DLT drives from TTI.



When you need to make backups fast, look to the company that makes the fastest backup! TTI's new CTS-2119 dual drive DLT subsystem backs up 20 gigabytes native or 40 gigabytes compressed, with transfer rates up to 5 megabytes per second. But blazing speed and high capacity are just the beginning.

Independently or as a team, two DLT drives can tackle your workload better than one. Need a copy for off-site storage? With the CTS-2119, you can either make it when you do your backup or do it later off-line. This feature alone can cut your workload in half and dramatically improve system availability.

Need to backup more than 20 gigabytes unattended? Just select cascade mode and store up to 40 gigabytes without a tape change. But the features don't stop there. With a menu-driven front panel, you can select from an extensive list of options including host support, SCSI ID, compression and density selections. Your investment is protected by allowing you to choose from a long list of supported host computers, including DEC, Sun, IBM AS/400 and RS/6000, SGI, HP and more. Need to move to another platform? No upgrade required! Simply select the new host from the menu.

Host software doesn't support DLT? No problem. Our DLT can emulate a number of drives, including 8mm, DAT and others. Last, but not least, a multi-segment LED display keeps you updated with the current tape status, including tape remaining, operation in progress and tape condition.

Why settle for ordinary tape backup when you can have extraordinary? Call TTI for complete information on the CTS-2119.

**TTI** TRANSITIONAL  
TECHNOLOGY, INC.

**(714)693-1133**

FAX: (714) 693-0225  
E-mail: [info@ttech.com](mailto:info@ttech.com)





# Contents

## Features

<b>Interex Toronto Conference</b>		18
<b>Networking Background for System Administrators, Part 1</b>	by Marty Poniatowski	22
<b>Software Review: Z-Mail</b>	by Greg Cagle	30
<b>Building Programs from the Internet</b>	by Sean Reifschneider	36
<b>Book Review: UNIX System Administration Handbook, 2nd Edition</b>	by Chris Curtin	40
<b>DAA Modem Control MUX Panel for the HP 1000 A and F Series</b>	by Wendy L. King	44

## Departments

<b>Q &amp; A</b>	8
<b>HP 1000 Guru</b>	70
<b>CSL Perspective</b>	76
<b>Industry Watch</b>	78
<b>Product Focus</b>	80
<b>New Products</b>	82

## Columns

<b>HP-UX Systems Administration</b>	by Chris Curtin	56
<b>HP-UX</b>	by David L. Totsch	60
<b>Internet Goodies</b>	by Joe Berry	62
<b>X-Watch</b>	by Larry Headlund	66

New Products  
See page 82



Hands-On Solutions for HP-UX Users

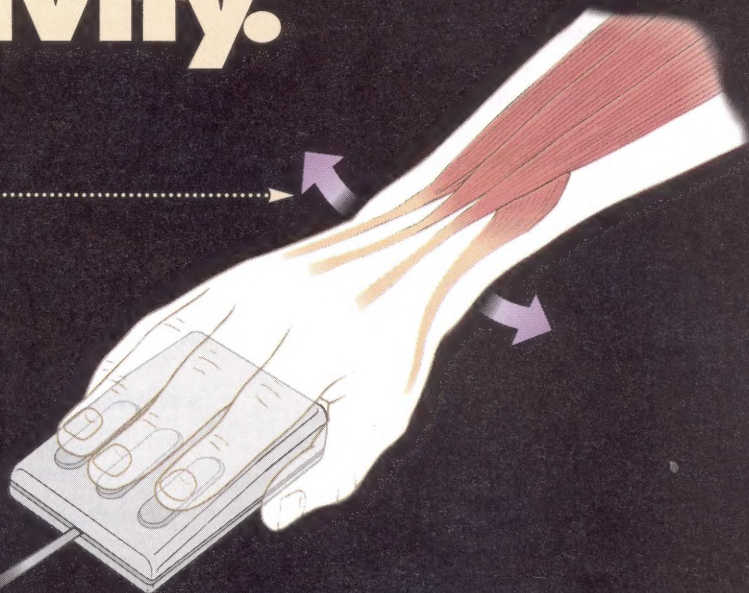
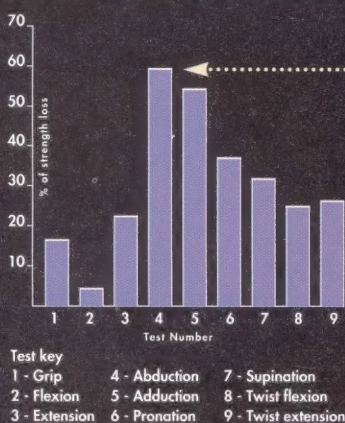
Cover Story:  
See page 22





# Lose your mouse and increase your productivity.

Strength Loss After 4 Hours of Mouse Usage



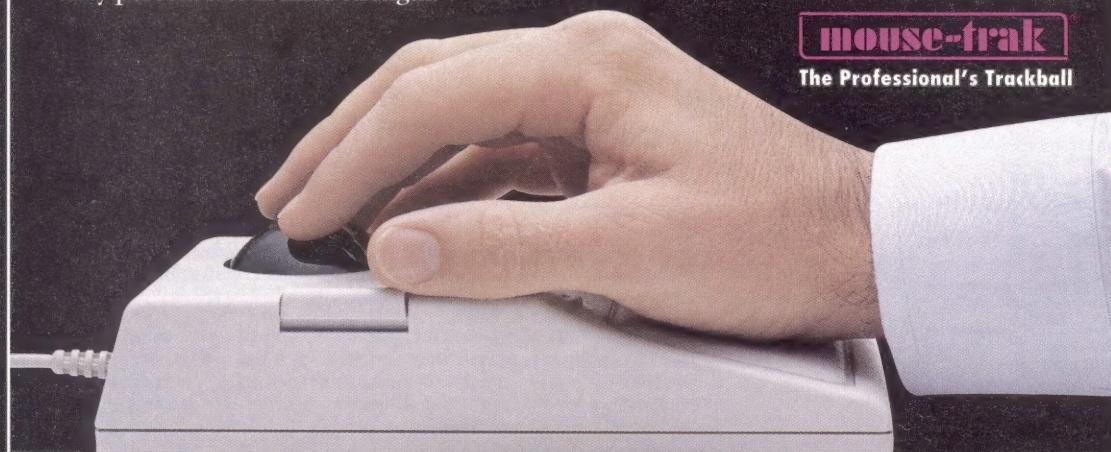
**Fatigue is not productive** If you spend your days chasing a mouse around a desktop, you know the feeling. Dull aches. Weak grip. Tired hand. The fact is, the advantages of "point and click" software are greatly diluted by the mouse most people use to point and click. Let's face it, mice were designed for consumer, not commercial use. In fact, studies show that using a mouse for one-half of an 8-hour day causes as much as sixty percent loss in hand strength.

**Give yourself a break!** The tests which showed the fatigue caused by sustained mouse usage showed MOUSE-TRAK caused little or no fatigue over the same period. Give yourself a break. Order a MOUSE-TRAK.

**Lose Your Mouse and Increase Productivity** To order your MOUSE-TRAK in the U.S.A. call:

1-800-533-4822  
sales@moustrak.com

**mouse-trak**  
The Professional's Trackball



#### INDUSTRIAL MODELS

HP/APOLLO	\$295
SUN Sparc	\$295
DEC	\$295
Silicon Graphics	\$295
NCD X-Terminal	\$295
RS/6000	\$295
PCserial	\$295
PS/2	\$295
Macintosh ADB	\$295
Access.bus	\$295

#### PROFESSIONAL MODELS

HP/APOLLO	\$199
SUN Sparc	\$199
DEC	\$199
Silicon Graphics	\$199
NCD X-Terminal	\$179
RS/6000	\$179
PCserial	\$179
PS/2	\$179
Macintosh ADB	\$179
Access.bus	\$199

ORDER TOLL FREE 1-800-533-4822

**International MOUSE-TRAK dealers:** UK NTWare Ltd. Tel: 0865 784990 • SunExpress Tel: 0800 89 88 88 • Inmac UK Tel: 44 (1) 9285 79090 • France Inmac France Tel: 33 (1) 6467 6447 • PHASELYS Tel: 1 43 94 42 42 • RISC TECHNOLOGY EUROPE Tel: 01 41 85 10 20 • SunExpress Tel: 05 90 61 57 • Germany The Chameleon Group Tel: 0211-379057 • SunExpress Tel: 01 30 81 61 91 • Switzerland Datacomp Tel: 01 740 51 40 • SunExpress Tel: 155 19 26 • Denmark DeSeCAM Tel: 48 24 12 04 • Holland SunExpress Tel: 06 022 34 45 • Canada Guillevin Tel: 416 670 8433 • Australia Hypec Electronics Tel: (02) 808 3666 • Sweden SPECMA Tel: 031 89 16 00 • SunExpress Tel: 020 795 726 • Korea Aurora Systems, Inc. Tel: 718-1985 • Israel Seg Tec Tel: 972 3 556 7458 • Japan SunExpress Tel: 0120-33-9096 • MOUSE-TRAK is manufactured in the U.S.A. by ITAC Systems, Inc., 3113 Benton Street, Garland, Texas 75042 Fax: 214/494-4159 Patented by ITAC Systems, Inc. MOUSE-TRAK is a registered trademark of ITAC Systems, Inc. Other brand and product names are trademarks of their respective holders.

CIRCLE 92 ON READER SERVICE CARD



## INTEREX EXECUTIVE DIRECTOR

**Charles A. Piercey**

## PUBLICATIONS MANAGER

**Connie Wright**

## EDITORIAL

### MANAGING EDITOR

**Michael Ehrhardt**

### COPY EDITOR

**Richard Kranz**

### NEW PRODUCTS EDITOR

**Michelle Pollace**

### PROOFREADER

**Jean Nattkemper**

## ADVERTISING & MARKETING

### ADVERTISING MANAGER

**Brian Hallin**

### ACCOUNT REPRESENTATIVE

**Liana Fisher**

### ADVERTISING COORDINATOR

**Nader Saghafi**

### MARKETING & COMMUNICATIONS MANAGER

**Dee Ellsworth**

## DESIGN AND PRODUCTION

### SENIOR GRAPHICS DESIGNER

**Molly McGinnity**

### DESKTOP PUBLISHING SPECIALIST

**June Ramirez**

### GRAPHICS PRODUCTION SPECIALIST

**Gale Patterson**

*hp-ux/usr* is published bimonthly by Interex, the International Association of Hewlett-Packard Computing Professionals. Third-class postage paid at Sunnyvale, California 94086 and additional offices. The editorial and business offices are located at 1192 Borregas Ave., Sunnyvale, California 94089, USA, 408.747.0227, Fax 408.747.0947. Address membership questions and change of address to Membership Services. Address all questions concerning circulation/distribution to the Distribution Manager.

Remittances should be sent to Interex,  
File No. 61054, P. O. Box 60000,  
San Francisco, California 94160, USA.

Address all editorial correspondence to Michael Ehrhardt,  
Editor, *hp-ux/usr* Magazine, c/o Interex,  
P.O. Box 3439, Sunnyvale, California 94088-3439, USA.

Member Services (Site or General) include a  
subscription to *hp-ux/usr*. For other Member Services  
refer to membership form.

Statements of fact and opinion are the responsibility  
of the authors alone and do not imply an opinion on  
the part of the Interex Board or Magazine.  
Entire contents copyright © 1995 by Interex.  
All rights reserved.

POSTMASTER: Send address changes to:  
Interex, P.O. Box 3439,  
Sunnyvale, California 94088-3439 USA.  
Attention: Member Services.

TRADEMARKS: UNIX, UNIX System Laboratories, Inc;  
HP-UX, Hewlett-Packard; X Window System,  
X Consortium, Inc.

Bulk rate U.S. postage paid  
Senatobia, MS . PERMIT # 30

## How to Contact Interex...

### EDITORIAL SUBMISSIONS

*hp-ux/usr* encourages readers to contribute their opinions, tips, and solutions. When sending letters for publication or to request author contribution guidelines, please address them to *hp-ux/usr* editor Michael Ehrhardt.

### Postal Address:

Interex  
P.O. Box 3439  
Sunnyvale, CA 94088-3439

### Office Address:

1192 Borregas Avenue  
Sunnyvale, CA 94089

Because of the difference in zip codes between our office address and P.O. Box, please be sure to address all regular mail to the P.O. Box. Any express service packages should be delivered to the Borregas Avenue address. Thank you for your attention to this small but significant detail.

### TELEPHONE:

The Interex switchboard is open 8:00 a.m.–5:00 p.m., Pacific Time. Call 800.468.3739 (U.S. and Canada) or 408.747.0227. After 5:30 p.m. our voicemail system will record your call.

### FACSIMILE:

Call 408.747.0947

### INTERNET:

To send e-mail to Interex, use the following address format:  
<IDname>@interex.org

The following IDs are currently active on Interex's HP 9000:

ID	Department
ehrhadt	<i>hp-ux/usr</i> Letters to the Editor, Q&A, and requests for author guidelines
postmaster	Internet support
cslhpx	Contributed Software Library
membership	Membership/subscription inquiries and services
pubs	Circulation and advertising inquiries
conference	Conference questions and arrangements

An example would be [ehrhadt@interex.org](mailto:ehrhadt@interex.org)  
Anything before the @ sign is case insensitive.

### COMPUSERVE:

Interex can be contacted via the CompuServe ↔ Internet gateway. To send CompuServe mail, use the following format:

>INTERNET: [ehrhadt@interex.org](mailto:ehrhadt@interex.org)

You can address your mail to specific departments using the ID's listed above.

Interex maintains a CompuServe account that is collected daily. Please address all messages to ID no. 76376, 1222.



**interex**

*Shared Knowledge.*

*Shared Power.*

As a not-for-profit association of HP computing professionals, Interex is dedicated to meeting the information, education, and advocacy needs of its members worldwide.

In today's world of rapidly changing technology, Interex puts hands-on solutions to hardware, software, and operating system problems at your fingertips. Because members actively contribute—exchanging ideas and sharing solutions—Interex is a vital link in the transfer of HP expertise.

Operating independently from Hewlett-Packard, Interex has more than 20 years of serving HP computing professionals. Through its publications, conferences, and volunteer committee structures, Interex has the qualifications to represent you, a valuable member of the HP user community.

Interex® is a trademark registered in the U.S. Patent and trademark office.



# Client/Server Makeover in Minutes!

Rejuvenate the look of your legacy programs automatically – simply apply Faces to your applications and watch it work wonders in minutes. Protect system investments by adding graphical interface application productivity.

Fine-tune your Faces screens, or go to work immediately: with Faces the choice is yours. Point and click tools make customizing screens a breeze.

Ready-to-use buttons and objects are included, or quickly add buttons to do specialized functions. A simple brush of Faces over your legacy programs gives them the easy-access look your users need without any application changes.

Faces allows you to:

- ☐ Link legacy applications to Windows applications like Excel or Lotus 1-2-3.
- ☐ Create on-line hypertext help for all legacy applications.
- ☐ Build applications directly from any ODBC/SQL database (including IMAGE and IMAGE/SQL).
- ☐ Update multiple databases from a single screen.
- ☐ Interface E-mail systems, and much more...

Access information more efficiently with Faces from API International. For more information contact [patrick@apinet.com](mailto:patrick@apinet.com) or...

Call 1-800-5 API USA

9:30 a.m.



CIRCLE 59 ON READER SERVICE CARD

## Ever want to get Lew Platt's attention? *We can.*



**Nobody gets HP's attention like Interex – the International Association of Hewlett-Packard Computing Professionals.**

We make it happen through our size – over 7,500 strong-minded, well-organized members dedicated to representing the interests of HP customers and users worldwide. And we make it happen through our unique relationship with HP—one based on a mutual credibility and respect that's grown over the past two decades.

We've been able to influence HP on issues from product support to customer relations. And our members are responsible for hundreds of

upgrades and enhancements to HP hardware and software.

With Interex, you'll find another kind of strength in numbers...the number of people who are there to share ideas and offer solutions whenever you need them.

Add it all up, and you'll see why Interex has long been the industry's most effective voice for HP customers and users.

**Join Interex today, and tap into the power that comes from people banding together to get what they need.**

**The International Association of Hewlett-Packard Computing Professionals**

Promoting Information Exchange via:  
Contributed Software,  
Technical Publications,  
Advocacy Forums,  
Conferences, and  
Regional & Special Interest User Groups

**For membership information, call, fax, or e-mail Interex.**

**Tel:** 800.468.3739 or 408.747.0227 **Fax:** 408.747.0947 **E-mail:** [membership@interex.org](mailto:membership@interex.org)





## Question & Answer

**Q:** My users are complaining that *cp* and *mv* are not 'friendly', that they will overlay an existing file without comment. An example is moving a series of files to a directory and misspelling the directory name, which causes all the files to be concatenated into one big file. How can I fix the command always to ask permission?

**A:** All three of the file movement commands (*cp*, *mv*, and *rm*) have an *-i* option but users will seldom use it. So a good workaround is to change the standard command with an alias (*ksh* and *csh* only, Bourne shell users must just be very careful). Here is an example in *.kshrc* (similar for *.cshrc*):

```
alias cp='/bin/cp -i'
alias mv='/bin/mv -i'
alias rm='/bin/rm -i'
```

Now, every time an existing file is about to get clobbered, the command will ask for permission.

**Q:** How can I determine the speed of my computer?

**A:** For the PA-RISC processors (Series 700 and 800), you can (as root) use:

```
adb -k /hp-ux /dev/mem
itick_per_tick/D
CTRL-D
```

Whatever the result is, either multiply by 100 to get the frequency in Hz or divide by 10000 to get the frequency in MHz. Here is an example in a script:

```
MHZ=`echo itick_per_tick/D | adb /hp-ux /dev/kmem \
    | tail -1 | awk '{print $2/10000}'`
```

Then: `echo $MHZ` will return the processor's speed in megahertz. This would be helpful for the Series 700 where new models of the 700 return the same ID from *uname(1)* but have a different clock speed, as with the 715/100.

Another method involves reading the kernel for this information. Note that this method, though more accurate than just the processor clock speed, does require a lookup table. In addition, this method is limited to HP-UX Version 9.0x only and does not work for Series 300/400.

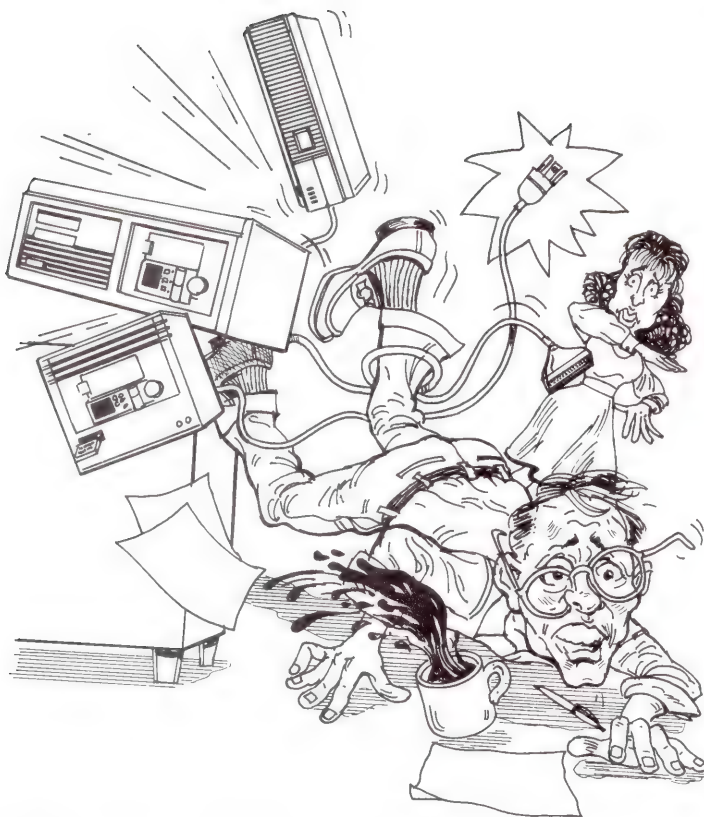
Each processor has a hardware version associated with it. This is read into kernel memory at boot time and is accessible by the diagnostics. It involves accessing *hversion* on the running system, using (1). Here are the steps:

Series 700:

```
echo "mpproc_info+34/X" | adb -k /hp-ux /dev/kmem
```



# It was UGLY.



Joe bit it when he tripped over a mess of SCSI and power cables (12 stitches). Two days ago, he disconnected the server from the network (4 hours downtime). Last week, he was taking apart a tape drive he thought was bad when his screwdriver slipped and hit the power supply (fried drive, power out for two hours). Stacy tried to help him out and called the vendor to get a replacement for the fried drive, only to find out it would be two days before one could be shipped (2 days without backup).

## Then came IEM Building Blocks.

IEM's Building Blocks are a simple solution to your problem. Disk, tape and optical Building Blocks are the core of the Building Block product line. These are the best industry-standard devices encased in carriers with the SCSI and power cables built-in. Just slide Building Blocks into a variety of enclosures for unlimited combinations and configuration flexibility.

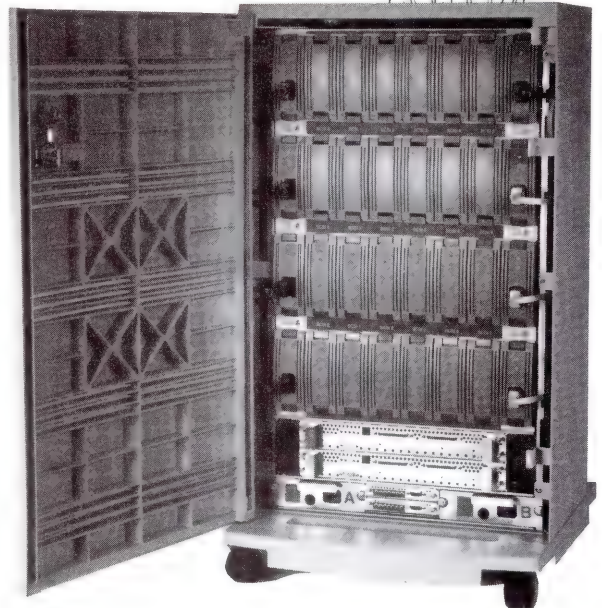
IEM offers a number of enclosure options.

- 3-slot Horizontal Desktop Enclosure
- 7-slot Carrier with Pedestal Enclosure
- Medium & Large Cabinets  
(hold up to 24 7-slot carriers)

Each enclosure is equipped with a pre-configured SCSI backplane, so all SCSI and power connections are made when a Building Block slides into place.

*Since there are no loose cables to trip over, Joe listens to his Walkman and dances around the lab freely with no fear of stitches or disconnecting the network. If a device goes down, Joe just slides it out of its slot and replaces it with another. He has retired his screwdrivers to the toolbox -- far away from the lab.*

IEM specializes in HP-compatible solutions. For more information on IEM products, please contact us at one of the numbers below.



**CIRCLE 96 ON READER SERVICE CARD**





Series 800:

```
echo "mpproc_info+1E8/X" | adb -k /hp-ux /dev/kmem
```

Caveat: This is valid for PA-RISC systems running some version of 9.0 and will not work on pre-9.0 systems. For Version 10.0, look for a new processor ID command.

The value returned can be compared to *Table 1* to determine exactly which hardware the system is running on.

This method will also work on a crashdump. Use the kernel file (e.g., *hp-ux.0*) and crashfile (e.g., *hp-core.0*) instead of the actual kernel and memory as in:

```
echo "mpproc_info+1E8/ X"|adb hp-ux.0 hp-core.
```

There may be new models not yet released that aren't listed. At 10.0, this technique can be replaced with a simple command.

**TABLE 1**

**SERIES 700 -**

<b>HVERSION</b>	<b>MODEL</b>	<b>HVERSION</b>	<b>MODEL</b>	<b>HVERSION</b>	<b>MODEL</b>
2000	720	3130	715s/33	6010	712/80
2010	750	3140	715i/50	6020	712/100
2020	730	3150	715i/33	6030	743i/60
2030	735	3160	715/75	6040	743i/100
2040	755	3180	725/50	60A0	715/64
2060	735/125	3190	725/75	60B0	715/100
3000	710	4010	745i/50	60D0	725/100
3020	705	4020	742i	6170	V743i
3100	715/50	4030	745i/100	6180	V743i/100
3110	715/33	6000	712/60	6190	715/80
3120	715s/50				

**SERIES 800 -**

<b>HVERSION</b>	<b>MODEL</b>	<b>HVERSION</b>	<b>MODEL</b>	<b>HVERSION</b>	<b>MODEL</b>
0040	840	1810	890	4800	806/E25
0080	825	1820	891/T500	4810	816/E35
00A0	835/635	1830	892/T520	4820	826/E45
00B0	845/645	2800	817/F20	4830	856/E55
00C0	850	2800	827/H20	2840	897/I50
0810	855	2810	837/F30	2870	887/G70/H70
0820	860	2810	847/G30/H30	2870	897/I70
1010	822	2820	807/F10	2880	887/G60/H60
1020	832	2830	867/G40/H40	2880	897/I60
1040	842	2830	877/I40		
1050	852	2840	887/G50/H50		



**Q:** I am having problems with my external CD-ROM drive connected to a new 9000/712. It is quite erratic and yet works fine on older systems.

**A:** The 712 as well as several newer 700 computers have a redesigned SCSI controller that is sensitive to cable lengths. Cables that are too *short* will cause problems with CD-ROM drives, as well as with magneto-optical drives. Using a longer cable should fix the problem.

**Q:** How can I force an eject of a CD-ROM or optical disc from a SCSI drive?

**A:** Here is a simple program to accomplish this task:

```
#include <sys/scsi.h>
eject_caddy()
{
    int flag=1;
    char buf[255];
    static struct scsi_cmd_parms open_door = {
        10, 1, 500,
        0xc4,
        0x01,
        0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
        0x00,
    };
    ioctl (fd, SIOC_CMD_MODE, &flag);
    ioctl (fd, SIOC_SET_CMD, &open_door);
    read (fd, buf, 0xff);
}
```

**Q:** How does *fs\_async* work? I thought that all UNIX filesystems used async writes to increase speed, but *fs\_async* is set to zero on my system.

**A:** It has no effect on data writes, which are async (unless explicitly made sync). The purpose of *fs\_async* is to control the writing of file system meta data such as inodes and directories. To provide *fsck(1M)* with the best chance of fixing a file system, some of the writes are orchestrated. This means that when a block is freed from a file, that file's inode is updated synchronously so that there is no possibility that two inodes both think they own it.

Changing the value of *fs\_async* affects whether the orchestration is maintained and will improve the performance of the filesystem. However, setting it to positive values can have a negative effect on *fsck(1M)*'s ability to restore a filesystem following a system failure. This translates into a high probability for losing files and directories if the system is shut down improperly.

The Series 700 use 4 values for *fs\_async* (-1, 0, 1, and 2) while the Series 800 uses just 0 and 1:

- 1 corresponds to the '0' value on Series 800 machines and is the safest setting for both machines.
- 0 makes some writes async on the 700, but is considered "safe."
- 1 makes a large number of un-orchestrated writes on both systems.
- 2 makes almost every write asynchronous and exists on only 700s.

Other settings are undefined. For a stable machine, with power and user access protected, use of *fs\_async* greater than 0 will improve filesystem performance, at the risk of extended data recovery after a failure.

**Q:** How can I set up *ftp* so users have access to files but not shells?

**A:** Here is how to set up *ftp* so that a group of users have only *ftp* access, all with their own individual passwords but all accessing the same set of files (i.e., the system thinks they are all really the same *ftp* user). With only a slight change, you can have a group of users who have only *ftp* access, all with their own individual passwords and access only to their own sets of files (this is left as an exercise for the reader).

1. Set up anonymous *ftp* (assumed in later instructions to be at */users/ftp*).
2. Add a user and group to */etc/passwd* and */etc/group*.  
For example, in */etc/passwd*:



# If you're an HP Computing Professional, you may be missing an important connection.

If you aren't a member of Interex, the International Association of Hewlett-Packard Computing Professionals, you're missing out on a number of valuable connections. Connections that can put you in touch with:

- Publications written to help you solve HP-UX problems
- Conferences designed to increase your knowledge and competitiveness
- Special and Regional Interest Groups to connect you with other users
- Advocacy efforts that give you a way to protect your investment in HP equipment

## Get connected!

Find out more about these valuable resources by calling us at **800.INTEREX** or **408.747.0227**, or e-mailing us at [membership@interex.org](mailto:membership@interex.org).

**interex**

*The International  
Association of  
Hewlett-Packard  
Computing Professionals*

```
ftpuser:*:1000:1000:FTP User:/users/ftp:/bin/false
```

and in */etc/group*:

```
ftpgroup:*:1000:ftpuser
```

Note that *ftpuser* login is disabled (a "\*" in the password field). This allows various utilities (such as *ls*) to recognize files that belong to an *ftp* user (particularly important for backups).

To give each *ftp* user his own private access, set up a unique disabled entry for each user.

3. In */users/ftp/etc*, you must have a group and passwd file, of the same format as their related system files. For example, in */users/ftp/etc/group* add:

```
ftpgroup:*:1000:
```

and in */users/ftp/etc/passwd* add:

```
ftpuser:*:1000:1000:FTP User:/users/ftp/ftpusers:/bin/false
```

Also, for each individual you want to allow access, add an additional entry. Note that these have passwords (see *passwd(1)* for instructions on setting passwords in this file):

```
george:3RgfBzfnipJPQ:1000:1000:George Smith \
FTP User)/users/ftp/ftpusers:/bin/false
```

A few things to notice. *ftpuser* is disabled. *george* has the same uid, gid, and home directory that *ftpuser* has. *george* will log in as "george" with his own password.

To give each *ftp* user his own private access, add an entry for each user that matches his */etc/passwd* entry.

4. Under */users/ftp*, create a directory "ftpusers." Make these directories with owner *ftpuser* and group *ftpgroup*, with 770 permissions. This effectively prevents anonymous *ftp* access to these directories, since it is not world readable/writable.

And that's it. Users access the system via anonymous:

```
$ ftp sysname
Connected to sysname.whatever.
220 sysname FTP server
Name (something:someuser): ftp
331 Guest login ok, send ident as password.
Password:
230 Guest login ok, access restrictions apply. Remote system type is UNIX.
Using binary mode to transfer files.
```

*Continued on Page 14*



HP Series	MB	1	2	4	8	12	16	32	64	128	256
HP-200/310/320											
HP-319											
HP-330/350/370											
HP-332											
HP-340											
HP-345/375/380											
HP-360											
HP-362											
HP-382											
HP-400/425/433											
HP-425E											
HP-700RX											
HP-705/710											
HP-715/725											
HP-720/730/735											
HP-742/745/747											
HP-750/755											
HP-8X7/9X7											
HP-FXX/GXX/HXX/IXX											

## PICK A CARD.

**Any card.** The memory you need is in stock, tested and ready to go. Order today. Upgrade your system tomorrow.

You'll get the quality and service you expect from the leader in HP workstation enhancements. We specialize in HP, it's the platform we know best.

Newport Digital TURBO cards and memory products are guaranteed to meet or beat HP quality standards. Every card we ship has been rigorously tested in a fully functional workstation, just like yours.

**Risk free.** Our total quality program gives us the confidence to offer an unconditional lifetime warranty. If one of our products fails, we'll ship a replacement by overnight express. We'll do anything we can to keep your workstation working.

**Call Today.** Speak with an expert on Hewlett-Packard computers. We'll make sure you get the cards you need.

Evaluate any of our memory products for 30 days. If you're not completely satisfied, return it without obligation.

**NEWPORT DIGITAL**  
1-800-383-3642

CIRCLE 85 ON READER SERVICE CARD



```
ftp> pwd
257 "/" is current directory.
```

Then, they use a sublogin to access their old files:

```
ftp> user george
331 Password required for george.
Password:
230 User george logged in.
ftp> pwd
257 "/users/ftp/ftpusers" is current directory.
ftp>
```

Users are placed in whatever directory is specified as their home directory in the `/users/ftp/etc/passwd` file.

To remove access, remove their passwd entry from `/users/ftp/etc/passwd`.

*General HP-UX and 9000 questions are answered by Bill Hassell, a support engineer at the HP Atlanta Response Center. He can be contacted via e-mail at [blh@hpuaerca.atl.hp.com](mailto:blh@hpuaerca.atl.hp.com).*

## Workstations

**Q:** I have an HP 9000/745i running HP-UX 9.05 with SICL (Standard Instrument Control Library) Version C.03.02f. I am seeing a problem with some code I developed to control a module via the VXI backplane. I am using the `ipeek()`, `ipoke()`, and `imap()` functions. To verify my code I tried compiling some similar example code supplied with SICL (`/usr/pil/example/vxidev.c`). The code runs fine when I compile with the standard C compiler; however, if I compile the code with the C++ compiler, the code aborts with a core dump when run. The SICL documentation states that it can be used with C or C++. I followed the instructions in the manual on how to compile and link the SICL library routines, both as shared and archived libraries:

(shared library)

```
CC -o mycode mycode.c -lsicl
```

(archived library)

```
CC -o mycode mycode.c /usr/lib/libsicl.a -Wl,-E -ldld
```

Is the documentation correct that SICL can be used with C++? Am I using the right compile commands for C++?

**A:** Yes, SICL is supported with C++. Yes, you are using the correct commands to compile and link the code. I suspect that your difficulty is due to a problem in the

C++ compiler. The problem is as follows. When you cast a pointer from a smaller size to a larger one and then dereference it, the C++ compiler does not generate an access of the larger size. Instead, it does multiple accesses of the smaller size and assembles the fragments together to produce a valid result. While this works for computer RAM, it does not work for hardware registers and, in particular, for many VXI devices that respond only to 16-bit accesses.

Thus the code:

```
*char ptr;

ptr = imap(...);
value = iwpeek(ptr + offset);
```

will do two 8-bit accesses, not one 16-bit access. Similarly, an `ilpeek` would do four 8-bit accesses.

The workaround is to assign the pointer to another pointer of the correct size before doing the `iwpeek` or `ilpeek`:

```
*char ptr;
unsigned short *ptr2;

ptr=imap();
ptr2=ptr + offset;

value=iwpeek(ptr2);
```

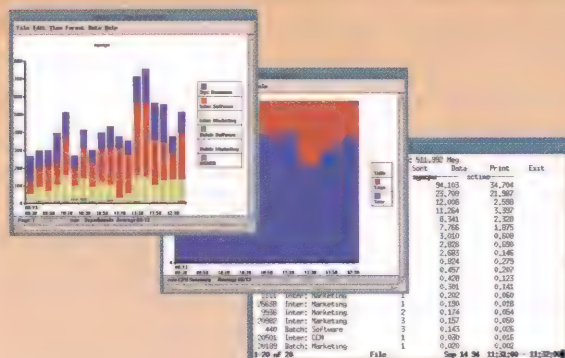
This will generate the correct code. Again, this is a C++ compiler problem, not a problem with SICL or the manual examples.

**Q:** I currently use an HP 9000/382 CPU running HP-UX 9.03 and BASIC/UX 6.3. Installed in the 382 is an HP 98622A GPIO interface. We use the



# Critical Solutions for Critical Systems

## TeamQuest Baseline™



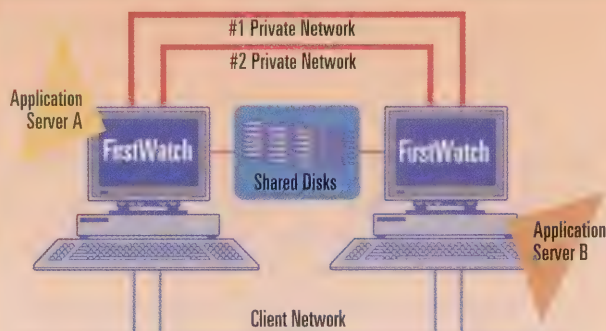
Drill down to find the root of the problem.

### Server Performance Analysis

- find out WHY performance is being effected and WHO or WHAT is responsible
- real-time and historical analysis
- plan for future capacity needs
- HP-UX, Solaris 2.x, SunOS

TeamQuest Baseline is a trademark of TeamQuest Corporation.

## First Watch™



### Failover Management Solutions

- automated failure detection, recovery, and failover
- cost-effective
- user-installable
- no kernel modifications required
- HP-UX, Solaris 2.x, SunOS

FirstWatch is a trademark of VERITAS Software Corporation.

Qualix provides client/server-based customers with a comprehensive suite of solutions for systems and network management.

- server performance management
- firewall technology
- high-availability

- centralized user access control
- heterogeneous virus scanning
- backup and archiving solutions
- power management



Qualix Group, Inc.

*Solutions for Managing Client/Server Systems*

Call today for more information on TeamQuest Baseline, FirstWatch or any of our other client/server products.

1900 S Norfolk Street, STE 224, San Mateo, CA 94403, voice 415-572-0200, fax 415-572-1300, e-mail [info@qualix.com](mailto:info@qualix.com), WWW <http://www.qualix.com>  
Eastern Office: 55 Madison Avenue, STE 200, Morristown, NJ 07960, voice 201-538-8772, fax 201-538-8826, e-mail [markk@qualix.com](mailto:markk@qualix.com)

1 - 8 0 0 - 2 4 5 - 8 6 4 9

CIRCLE 54 ON READER SERVICE CARD



GPIO interface to control a peripheral device developed in-house. We access the GPIO interface through BASIC/UX code that we developed to use the interface to control our device. We are thinking of migrating to an HP 9000 Series 700 CPU and I would like to know if there is a GPIO card available for the Series 700 platform, and will we be able to move our code to the Series 700 platform?

**A:** Yes, HP recently introduced a GPIO card for the Series 700 platform. The product number for the GPIO card is E2074A. The card plugs into the EISA backplane and can be accessed via SICL (Standard Instrument Control Library) or BASIC/UX Revision 7.1.

**Q:** I have an HP 9000/715 running HP-UX 9.05. I recently purchased BASIC/UX 7.1 and loaded it on my system. I plan on using it to control an HP E2071B high-speed HP-IB card I have installed in the EISA backplane. I understand that BASIC/UX includes SICL (Standard Instrument Control Library), which is used for access to the HP-IB card. Since BASIC/UX includes SICL, can I now use the SICL library with C code to access the HP-IB card?

**A:** No, BASIC/UX contains only the SICL run-time files. If you would like to do C-language SICL programming, you will need to purchase the SICL 3.02 product to be compatible with your BASIC/UX 7.1. You will also need the HP-UX 9.05 C Developer's Bundle.

**Q:** I just received my new HP 9000/712 computer. I loaded HP-UX 9.05 and brought the system up with no problems. I am now trying to get the audio working on the 712. I tried running the `/usr/audio/bin/audio_editor` but it comes up with an error dialogue that says "Unable to access the audio hardware." I have checked the `/dev` directory and I have the following device files:

```
crw--w--w- 1 root    sys    57 0x208000 Feb 17 11:32 /dev/audio
crw--w--w- 1 root    sys    57 0x208002 Jul 28 1994 /dev/audioBA
crw--w--w- 1 root    sys    57 0x208003 Jul 28 1994 /dev/audioBL
crw--w--w- 1 root    sys    57 0x208001 Jul 28 1994 /dev/audioBU
crw-rw-rw- 1 root    sys    57 0x208100 Jul 28 1994 /dev/audioCtl
crw--w--w- 1 root    sys    57 0x208012 Jul 28 1994 /dev/audioEA
crw--w--w- 1 root    sys    57 0x208013 Jul 28 1994 /dev/audioEL
crw--w--w- 1 root    sys    57 0x208011 Jul 28 1994 /dev/audioEU
crw--w--w- 1 root    sys    57 0x208022 Jul 28 1994 /dev/audioIA
crw--w--w- 1 root    sys    57 0x208023 Jul 28 1994 /dev/audioIL
crw--w--w- 1 root    sys    57 0x208021 Jul 28 1994 /dev/audioIU
```

Are these device files correct, do they have the right permissions, or is there another reason for the error?

**A:** Your device files are correct and they have the right permissions. I suspect that the reason you cannot run the `audio_editor` is because you have not completely configured the audio subsystem on your 712. The audio subsystem requires a couple of processes to be running in the background to connect the software to the hardware. These processes are as follows: Two audio server processes called *Aserver* must be running on the workstation, along with a Local Location Broker daemon called *llbd*. The *Aserver* executable is located under `/usr/audio/bin` and the *llbd* executable under `/etc/ncs`. The *Aserver* processes require the *llbd* be started first; if the *llbd* is not running when you start the audio server, you will get a message "Can't register server with *llbd*." To start the *llbd* and the *Aserver*, use the following steps:

1. Log in as superuser
2. Execute the command:

```
/etc/ncs/llbd
```

3. Verify the *llbd* started by executing:

```
ps -ef | grep llbd
```

4. If the *llbd* is running, execute the command:

```
/usr/audio/bin/Aserver
```

5. Verify that two *Aserver* processes were started by executing the command:

```
ps -ef | grep Aserver"
```

You should now be able to run the `audio_editor` without error. To ensure



# WELCOME TO THE NEXT LEVEL IN UNIX TO NETWARE PRINTING

**PRINTPATH/NLM™** is a 100% software solution for printer sharing between UNIX systems and Novell NetWare servers over TCP/IP connections. **PRINTPATH/NLM** implements the UNIX **LPD/LPR** printing protocol on the NetWare server allowing the server to exchange print files with any system that supports the **LPD/LPR** printing protocol.

NetWare server print queues can be defined as remote printiners on UNIX systems and accessed via standard **lp** command syntax. No software is required on the UNIX system.

NetWare print queues can be exported to any printer on any UNIX system or to TCP/IP printers on the network. Supports multiple simultaneous connections in either direction.



**PRINTPATH/NLM** delivers Unix host generated output to printers located near your NetWare users and allows network users to easily take advantage of host printing resources. All in a simple, reliable and inexpensive package.

The **PRINTPATH/NLM** 30-Day Demonstration is free and is the best way to see the printing capability and flexibility that **PRINTPATH/NLM** can bring to your network.

**RAC CONSULTING**  
**BOX 10099, OLYMPIA, WA. 98502**

**(360/206)-357-9572**  
**FAX: (360/206)-352-8453**

CIRCLE 152 ON READER SERVICE CARD

these processes are restarted when the system is re-booted, edit the following files and make the suggested changes:

1. To make *llbd* start automatically at boot time edit the */etc/netnsrc* file and change the line

```
START_LLBD=0
```

```
to
```

```
START_LLBD=1
```

2. Create an */etc/audiorc* file containing these lines:

```
#!/bin/sh
```

```
if [ -x /usr/audio/bin/Aserver ]
```

```
then
```

```
    echo "Starting Aserver"
```

```
    /usr/audio/bin/Aserver
```

```
    exit 0
```

```
fi
```

3. Set the permissions on the */etc/audiorc* file to:

```
/etc/audiorc  -r-xr--r--  root  sys
```

4. Add the following section to the *localrc()* procedure in the */etc/rc* file:

```
localrc()
{
.
.
.
# Start up the audio server
if [ -x /etc/audiorc ]
then
    /etc/audiorc
fi
}
```

*Rudy Stanley is an applications support engineer with the Hewlett-Packard Response Center in Atlanta, Georgia. He can be reached via e-mail at: [brst@hpuaatl.att.hp.com](mailto:brst@hpuaatl.att.hp.com).*



## The MUST ATTEND conference for builders, managers, and users in HP 9000 environments

Whether you're migrating from HP-UX 9.0 to HP-UX 10.0, integrating your HP 9000 into a client-server environment, or just fine-tuning your HP-UX system, the Interex '95 Conference & Expo is where you need to be August 14-18.

■ **Information-Packed Seminars**—Get a head start on implementing HP-UX 10.0 by attending *Migrating to HP-UX 10.0x—Issues and Answers*. At this all-day intensive seminar, system administrators and programmers alike will learn how to develop strategies and tactics to migrate successfully from HP-UX 9.0 to HP-UX 10.0. Or, if security issues in your UNIX environment are a concern, attend the full-day *HP-UX and Internet Security* seminar and learn how over 90 percent of UNIX and HP-UX security issues can be solved by good user and administration practices.

■ **The HP Solutions Center**—Personally test-drive HP products for the 9000 in a networked environment, and get advice from the experts on how to improve your own 9000 environment.

■ **The HP-UX Technical Roundtable**—Participate in discussions with a panel of experts on technical matters, performance, and future planning.

■ **Plenary Sessions**—HP's Carol Mills, General Manager, General Systems Division (GSY) will give a high-level view

of current strategies and future directions for the 9000 Series 800. HP's strategy to become the dominant supplier of enterprise-based technical solutions will be presented by Mark Canepa, General Manager, Hewlett-Packard's Workstation Systems Division (WSY).

■ **Tutorials and Paper Presentations**—

More than 200 tutorials and paper presentations to bring you up-to-date on key technologies and computing strategies for the 1990s.

■ **Client-Server Roundtable**—a special event highlighting the major issues involved in implementing client-server technology.

■ **HP-focused**—whether you're in a proprietary or a heterogeneous environment, HP-UX or RTE-focused, you can gather everything you need to know about Hewlett-Packard systems. No matter how you approach information technology, Interex '95 has something for you.

Hot topics and concerns for *all* computing professionals will also be addressed at Interex '95: open systems standards, interoperability, desktop integration, emerging technologies (such as data warehousing and multimedia), and business-critical issues such as how to incorporate system re-engineering into the business environment.

### Tutorials, paper presentations, and panels of particular interest to HP-UX and workstation users include:

- Performance Basics for HP-UX and Software Installation
- Integrating UNIX Workstations with PCs and Macs
- Assistance in Preparing for HP-UX
- Growing into the HP 9000: Augmenting Your HP 3000 with a UNIX Server
- SD-UX 10.0 Software Management
- System Administration for HP 10.0
- Upgrading to HP-UX 10.0
- 10.0 SAM Customization Opportunities

For more information about the HP computer event of the year, consult the Interex '95 Conference and Expo brochure. If you haven't received your free copy, just call us at 1.800.990.EXPO, or 408.747.0227, fax: 408.747.0947, e-mail: [conference@interex.org](mailto:conference@interex.org), or to access us via the World Wide Web: <http://www.interex.org>



See page 21 to register for Interex '95

# Interex 95

Conference & Expo

## Power Keynotes & Plenaries

- \* **Lew Platt**  
*President & CEO,  
Hewlett-Packard Co.*
- \* **Don Tapscott**  
*Co-author of  
The Paradigm Shift*
- \* **Dan Branda**  
*President, Hewlett-Packard (Canada) Ltd.*
- \* **Frank Ogden**  
*Canadian Futurist*
- \* **Larry DeBoever**  
*Founder, DeBoever  
Architectures*
- \* **Olivier Helleboid**  
*General Manager, CSY,  
Hewlett-Packard Co.*
- \* **Carol Mills**  
*General Manager, GSY,  
Hewlett-Packard Co.*
- \* **Mark Canepa**  
*General Manager, WSY,  
Hewlett-Packard Co.*

- Development Technology
- IT Management

## Who should attend?

Builders, Managers & Users who need to know about the future of HP computing solutions.

- Programmers
- Software Developers
- Buyers & Resellers
- System Integrators
- Network Managers
- Information System Managers
- Service Providers
- Corporate Management
- Consultants
- HP Personnel



## A Day with Dr. James Wetherbe

The internationally renowned Dr. Wetherbe, Professor and Director, Management Information Systems Research Center, Carlson School of Management, University of Minnesota, will headline the 1995 Management Symposium. Find out how to use best practices in systems development and how to communicate effectively to meet the challenges of today's IT environment.

## Main Conference Tracks

- Operating Systems Technology
- Networking Technology
- Database Technology

## Manufacturing Productivity Users' Conference

New this year, the Manufacturing Productivity Users' Conference will run concurrently with the Conference & Expo. This unique event gives manufacturing professionals the chance to attend sessions that address the business needs of MMII and other HP Manufacturing application users.

# World's Largest Expo of HP Computer Products and Services

More than 180 exhibitors! Check out the latest HP products and services for HP open systems, eliminate months of research, and find the information you need to make the right buying decisions. Single-platform or multi-platform, client-server to desktop—no matter how you use HP products in your computing environment, the best solutions are at Interex '95.





# Toronto Is Site of This Year's Interex '95 Conference & Expo

*Toronto*, one of North America's most exciting cities, derived its name from the Huron word for "meetingplace." Next August 14-18, it will be the gathering site for those fortunate enough to attend the Interex '95 Conference & Expo.

Metropolitan Toronto, Canada's largest city, is the country's cultural, financial, and transportation hub—and its number one visitor destination. A vibrant cosmopolitan metropolis, Toronto, located on Lake Ontario, is one of the most ethnically diverse cities in the world, with an array of cultural events, 4,000 restaurants, a variety of marketplaces, and a wide range of recreational and sports activities.

The opportunities for exploring the city are many: ♦

A Toronto landmark hard to miss is the CN Tower, the tallest freestanding structure in the world, with three observation decks and a revolving restaurant.

Ontario Place is a 56-acre waterfront park that includes a vast boat marina, a geodesic dome with an IMAX theatre, and a retired Canadian warship. This entertainment complex has something for everyone, including an outdoor performance area with seats for 2,500 and grassy surroundings.

Casa Loma, the city's elegant Edwardian castle, features furnished rooms, secret passages, towers, an 800-foot tunnel, and stables.

Harbourfront Centre, occupying 10 acres, is a cultural organization that produces and presents International Arts Festivals, marine activities, and a variety of children's events.

A shopper's paradise, Toronto sports elegant boutiques, the world's largest indoor antique market, as well as other fine establishments.

The city abounds with parks. A series of interconnected islands in Toronto Harbour are accessible by ferries that lead to beaches, an amusement park, and charming communities. High Park, Toronto's "Central Park," features hiking trails, outdoor festivals, and summer activities.

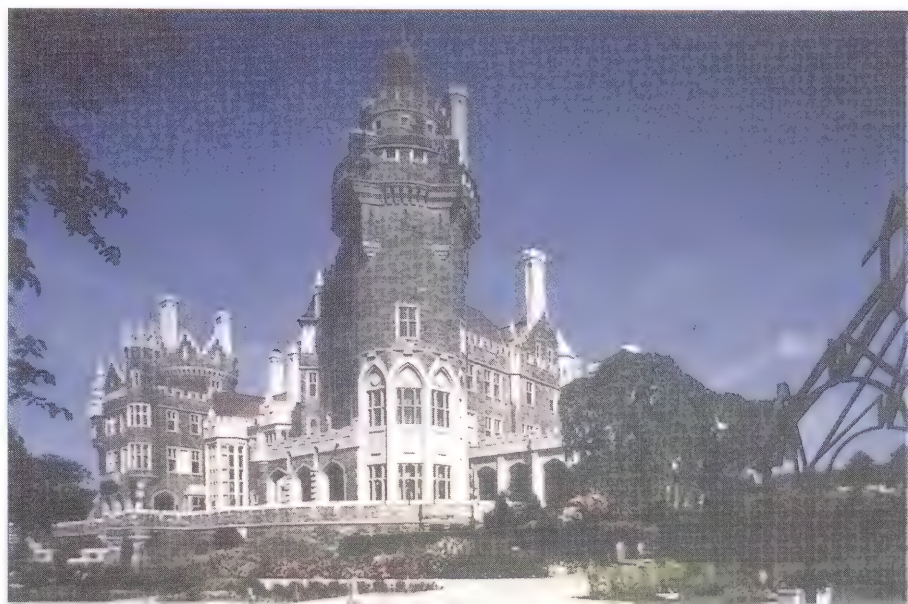
In short, there's something for everyone. See you in August!



CN Tower ↑

*This vibrant cosmopolitan city sports attractions to please visitors with a wide array of interests.*

Casa Loma ↓





# Interex '95

Toronto Ontario  
Canada

August 14 - 18, 1995

## REGISTRANT STATUS

Check appropriate box.

- ☐ I am an Interex member:  
You must be the contact in member record. Member ID# \_\_\_\_\_
- ☐ I am joining Interex with this registration to receive the member rate.  
See page 55 of your Call For Registration Brochure for membership information.  
An ID# will automatically be assigned to me.
- ☐ I am a member of a NUG affiliated with HPIUGA.\*\*  
Must write Name of NUG.

## PROFILE

### Number of computers currently owned and/or planned for purchase at your site:

	Quantity owned	Planned for purchase ✓ all that apply
<b>Computer Systems - HP</b>		Yes
HP 3000 MPE/XL/iX	<input type="checkbox"/>	<input type="checkbox"/>
HP 3000-Any Classic	<input type="checkbox"/>	<input type="checkbox"/>
HP 9000 Series 800	<input type="checkbox"/>	<input type="checkbox"/>
HP 9000 Series 700	<input type="checkbox"/>	<input type="checkbox"/>
HP 9000 Series 300/400/500	<input type="checkbox"/>	<input type="checkbox"/>
Apollo Domain Workstation	<input type="checkbox"/>	<input type="checkbox"/>
X-terminal	<input type="checkbox"/>	<input type="checkbox"/>
HP 1000	<input type="checkbox"/>	<input type="checkbox"/>
<b>Computer Systems - non-HP</b>		
IBM S/3x, AS/400	<input type="checkbox"/>	<input type="checkbox"/>
IBM RS/6000	<input type="checkbox"/>	<input type="checkbox"/>
DEC VAX	<input type="checkbox"/>	<input type="checkbox"/>
DEC Alpha	<input type="checkbox"/>	<input type="checkbox"/>
Sun	<input type="checkbox"/>	<input type="checkbox"/>
Sun Sparc/Compatible	<input type="checkbox"/>	<input type="checkbox"/>
Tandem	<input type="checkbox"/>	<input type="checkbox"/>
Wang	<input type="checkbox"/>	<input type="checkbox"/>
Unisys	<input type="checkbox"/>	<input type="checkbox"/>
Prime	<input type="checkbox"/>	<input type="checkbox"/>
IBM PS/2/PC/XT/AT/RT/Clone	<input type="checkbox"/>	<input type="checkbox"/>
Apple Macintosh	<input type="checkbox"/>	<input type="checkbox"/>
NeXT	<input type="checkbox"/>	<input type="checkbox"/>
None of the above	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

	Currently have/use	Plan to upgrade/purchase
<b>Operating System - HP</b>	Yes	Yes
HP-UX	<input type="checkbox"/>	<input type="checkbox"/>
MPE/iX	<input type="checkbox"/>	<input type="checkbox"/>
MPE V	<input type="checkbox"/>	<input type="checkbox"/>
RTE-All Systems	<input type="checkbox"/>	<input type="checkbox"/>
Domain	<input type="checkbox"/>	<input type="checkbox"/>
<b>Operating System - non-HP</b>		
UNIX (non-HP)	<input type="checkbox"/>	<input type="checkbox"/>
MVS or VM (IBM)	<input type="checkbox"/>	<input type="checkbox"/>
VMS (DEC)	<input type="checkbox"/>	<input type="checkbox"/>
Windows NT	<input type="checkbox"/>	<input type="checkbox"/>
OS/2	<input type="checkbox"/>	<input type="checkbox"/>
Windows/DOS	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

### Your title: (check one)

- Owner/President/CEO ☐ Systems Mgr./Admin. ☐
- VP/Corporate Officer ☐ Comm./Technical Mgr. ☐
- CFO/Controller ☐ Systems Analyst ☐
- CIO/MIS Director ☐ Programmer ☐
- MIS Manager ☐ Operator ☐
- MIS Staff ☐ Consultant/Educator ☐
- Operations Manager ☐ Other Manager ☐
- Scientist/Researcher ☐
- Other ☐

### Priority Code (Required):

(indicated on label)

a

Last Name		First Name		MI
Company				
Address				
City		Prov./State	Zip	
Country		Telephone	Fax	
E-mail		Signature		Date

d

## REGISTRATION SELECTION AND FEES

This form must be postmarked by July 28, 1995 for early-bird rate.

All selections include the Expo Pass.

### SPECIAL PACKAGES

	Early Bird Rate	Regular Rate
1. <input type="checkbox"/> Conference Passport Includes all events: Interex Main Conference & Expo, Manufacturing Productivity Conference★, and <input type="checkbox"/> Monday Management Symposium or <input type="checkbox"/> Monday Seminar # _____ SELECT ONLY ONE Indicate Number	\$1390 u.s.*	\$1490 u.s.*
2. <input type="checkbox"/> Main Conference & Expo + Management Symposium or <input type="checkbox"/> Main Conference & Expo + Training Seminar # _____ Indicate Number (Monday)	\$1290 u.s.*	\$1390 u.s.*
3. <input type="checkbox"/> Manufacturing Productivity Conference★ + Management Symposium or <input type="checkbox"/> Manufacturing Productivity Conference★ + Training Seminar # _____ Indicate Number (Monday)	\$1190 u.s.*	\$1290 u.s.*
4. <input type="checkbox"/> Main Conference & Expo + Manufacturing Productivity Conference★ (Tues.-Fri.)	\$895 u.s.*	\$995 u.s.*
*****		
<b>INDIVIDUAL SELECTIONS</b>		
<input type="checkbox"/> Interex Main Conference & Expo (Tues.-Friday) Daily (indicate days) <input type="checkbox"/> Tues. <input type="checkbox"/> Wed. <input type="checkbox"/> Thurs.	\$795 u.s.*	\$895 u.s.*
<input type="checkbox"/> Manufacturing Productivity Conference★ & Expo (Tues.-Thurs.) Daily (indicate days) <input type="checkbox"/> Tues. <input type="checkbox"/> Wed. <input type="checkbox"/> Thurs.	\$695 u.s.*	\$795 u.s.*
<input type="checkbox"/> Interex Management Symposium (Monday)	\$595 u.s.*	\$695 u.s.*
<input type="checkbox"/> Interex Training Seminar (Monday) # _____ Indicate Number (Monday)	\$495 u.s.	\$595 u.s.
<input type="checkbox"/> Expo Plus Pass—Pre-registered On-Site	Free	\$50 u.s.

e

## PAYMENT

All Fees Must Be Paid Prior To Conference

Fee for Conference Registration \$ \_\_\_\_\_ U.S.

If not an Interex member,  
add \$200 U.S.

Or

Fee for "JOIN and GO" membership \$ \_\_\_\_\_ U.S.

See membership information on page 55  
of your call for registration brochure.

TOTAL AMOUNT DUE \$ \_\_\_\_\_ U.S.

\* If not an Interex member, add \$200 U.S.

\*\*All conference materials will be mailed to the main address  
or NUG address without exception. You may add/change  
the mail stop only.

\* Interex membership not applicable to  
MP Conference registrations.

### SELECT PAYMENT OPTION

- ☐ Check: Payable to Interex
- ☐ Bill My Company/P.O.# \_\_\_\_\_
- ☐ Charge to: ☐ VISA ☐ MasterCard ☐ American Express

Expiration Date \_\_\_\_\_ / \_\_\_\_\_ Card Number \_\_\_\_\_

Name on card: \_\_\_\_\_ Please Print

Signature: \_\_\_\_\_

☐ Check this box if this form is confirming a previous  
phone or fax registration.

**CANCELLATION POLICY:** In the event of cancellation, a written notice  
must be received no later than September 1, 1995 and a 20% cancellation  
fee will apply.

Mail to: Interex, P.O. Box 3439, Sunnyvale, CA 94088-3439 or call 1.800.990.EXPO (U.S. and Canada),  
408.747.0227 or Fax 408.747.0947



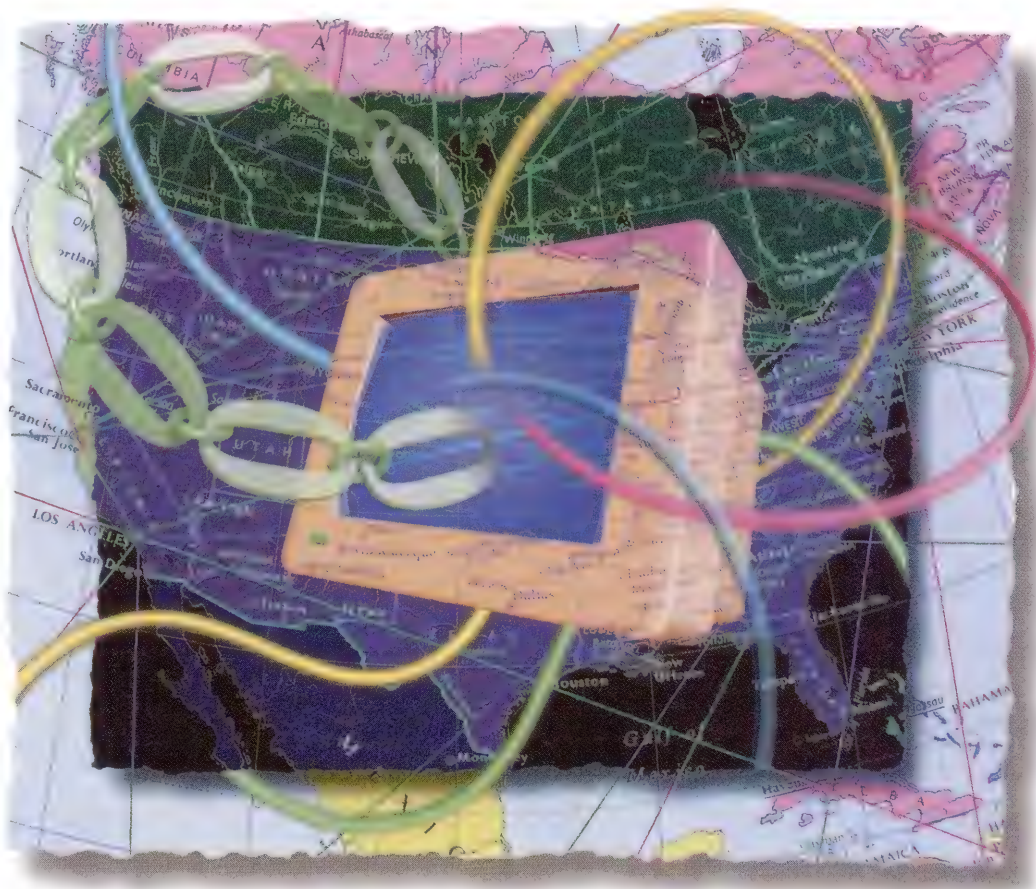
# Networking

## Part 1

# Background<sup>For</sup>

## SYSTEM ADMINISTRATORS

by Marty Poniatowski



**N**etworking is the aspect of system administration that varies the most from installation to installation. Some installations, such as highly centralized and isolated systems that have only ASCII terminals connected to the system, require the system administrator to pay very little attention to networking. Other installations, such as highly distributed environments in which thousands of systems are connected to a network that may span many geographic sites, may require the system administrator to pay a great deal of attention to networking. In this scenario the amount of time a system administrator devotes to networking may exceed the amount of time spent on all other system administration functions combined! Rather than ignoring networking altogether, as the first system administrator might, or covering all aspects of network

administration, as the second system administrator might, I will cover the aspects of network administration that most new system administrators care about. This is based on my experience working in a variety of new HP-UX installations. If you require more networking background than I provide, I would recommend as an excellent source of networking information *UNIX Networks*, by Bruce H. Hunter and Karen Bradford Hunter, Prentice Hall, ISBN 013-08987-1.

In this two-part article, I'll provide background and information on many networking topics, including the following:



- general UNIX networking
- Internet Protocol (IP) addressing (classes A, B, and C)
- subnet mask
- ARPA services
- Berkeley commands
- host name mapping
- Network File System (NFS)
- HP-UX networking commands
- examples

## UNIX Networking

Connecting to other machines is an important part of every HP-UX network. This means connecting both to other UNIX machines as well as to non-UNIX machines. The machines must be physically and functionally connected to one another so you can perform such tasks as transferring files and logging in to other systems. Many commands on your HP-UX system provide you with the functionality to log in and transfer files between systems. These are known as the ARPA commands *telnet* and *ftp*.

The *telnet* command allows remote logins in a heterogeneous environment. From your HP-UX system, for instance, you can telnet to non-HP-UX systems and log in to them. After login on the remote system, you must have an understanding of the operating system running on that system. If you need to connect to a different computer only for the purpose of transferring files to and from the system, then you can use *ftp*. This command allows you to transfer files between any two systems without having an understanding of the operating system running on the remote system. You need only an understanding of the *ftp* commands to perform the file transfer. Both of these commands are covered in detail.

These commands are somewhat primitive compared to the commands that can be issued between UNIX systems. To UNIX systems, networking is not an afterthought that needs to be added on to the system. The *ftp* and *telnet* commands come with your HP-UX system, as do more advanced commands and functionality that you can use to communicate between your HP-UX system and other UNIX systems. These more advanced

commands, known as Berkeley commands, allow you to perform many functions remotely, e.g., copying files and directories and logging in. This functionality continues to increase to the point that you are working with files that can be stored on any system on the network and your access to these files is transparent to you with the Network File System (NFS).

Before I cover these commands, let's take a look at some networking background.

## What Is All This Ethernet, IEEE 802.3, TCP/IP Stuff Anyway?

To understand how the networking on your HP-UX system works, you first must understand the components of your network that exist on your HP-UX system. There are seven layers of network functionality on your HP-UX system, as shown in *Figure 1*. I'll cover the bottom four layers in a cursory manner so you can see how each plays a part in the operation of your network and therefore be more informed when you configure and troubleshoot networking on your HP-UX system. The top layers are the ones that most HP-UX system administrators spend time working with because they are closest to the functionality you can relate to. The bottom layers are, however, also important to understand at some level so you can perform any configuration necessary to improve the network performance of your system, which will have a major impact on the overall performance of your system.

I'll start reviewing the diagram in *Figure 1* at the bottom, with layer 1, and describe each of the four bottom layers. This is the International Standards Organization Open Systems Interconnection (ISO/OSI) model. It is helpful in visualizing how networking layers interact.

### Physical Layer

The beginning is the physical interconnect between the systems on your network. Without the physical layer you couldn't communicate between systems and all of the great functionality you would like to implement would not be possible. The physical layer converts the data you wish to transmit to the analog signals that travel along the wire (I'll assume for now that whatever physical layer you have in place uses wires). The information travelling into a network interface is taken off the wire and prepared for use by the next layer.



**FIGURE 1** ISO/OSI Network Layer Functions

Layer #	Layer Name	Data Form	Comments
7	Application		User applications here
6	Presentation		Applications prepared
5	Session		Applications prepared
4	Transport	Packet	Port to Port transportation handled by
3	Network	Routing	routing by either going directly to the destination or default route
2	Link	Frame	Data encapsulated in IEEE 802.3 with source and destination addresses
1	Physical		Physical connection between systems. Usually

is the Maximum Transfer Unit (MTU). The *ifconfig* command covered shortly displays the MTU for your interface. The data in Ethernet is called a *frame* (the re-encapsulation of data at the next layer up is called a *datagram* in IP, and encapsulation at two levels up is called a *packet* for TCP).

Keep in mind that Ethernet and IEEE 802.3 will run on the same physical connection, but there are indeed differences between the two encapsulation methods. With your HP-UX systems you won't have to spend much, if any, time setting up your network interface for encapsulation.

### Network Layer

Next we work up to the third layer, which is the network layer. This layer on UNIX systems is synonymous with Internet Protocol (IP). Data at this layer are called *datagrams*. This is the layer

that handles the routing of data around the network. Data that gets routed with IP sometimes encounters an error of some type, which is reported back to the source system with an Internet Control Message Protocol (ICMP) message. We will see some ICMP messages shortly, as well as *ifconfig* and *netstat*, two HP-UX commands used to configure this routing.

Unfortunately, the information IP uses does not conveniently fit inside an Ethernet frame, so you end up with fragmented data. This is really re-encapsulation of the data so you end up with a lot of inefficiency as you work your way up the layers.

IP handles routing in a simple fashion. If data is sent to a destination connected directly to your system, then the data is sent directly to that system. If, on the other hand, the destination is not connected directly to your system, the data is sent to the default router. The default router then has the responsibility of getting the data to its destination. This routing can be a little tricky to understand so I'll cover it in some detail shortly.

### Transport Layer

This layer can be viewed as one level up from the network layer because it communicates with ports. TCP is the most common protocol found at this level and it forms packets

**FIGURE 2** Ethernet Encapsulation

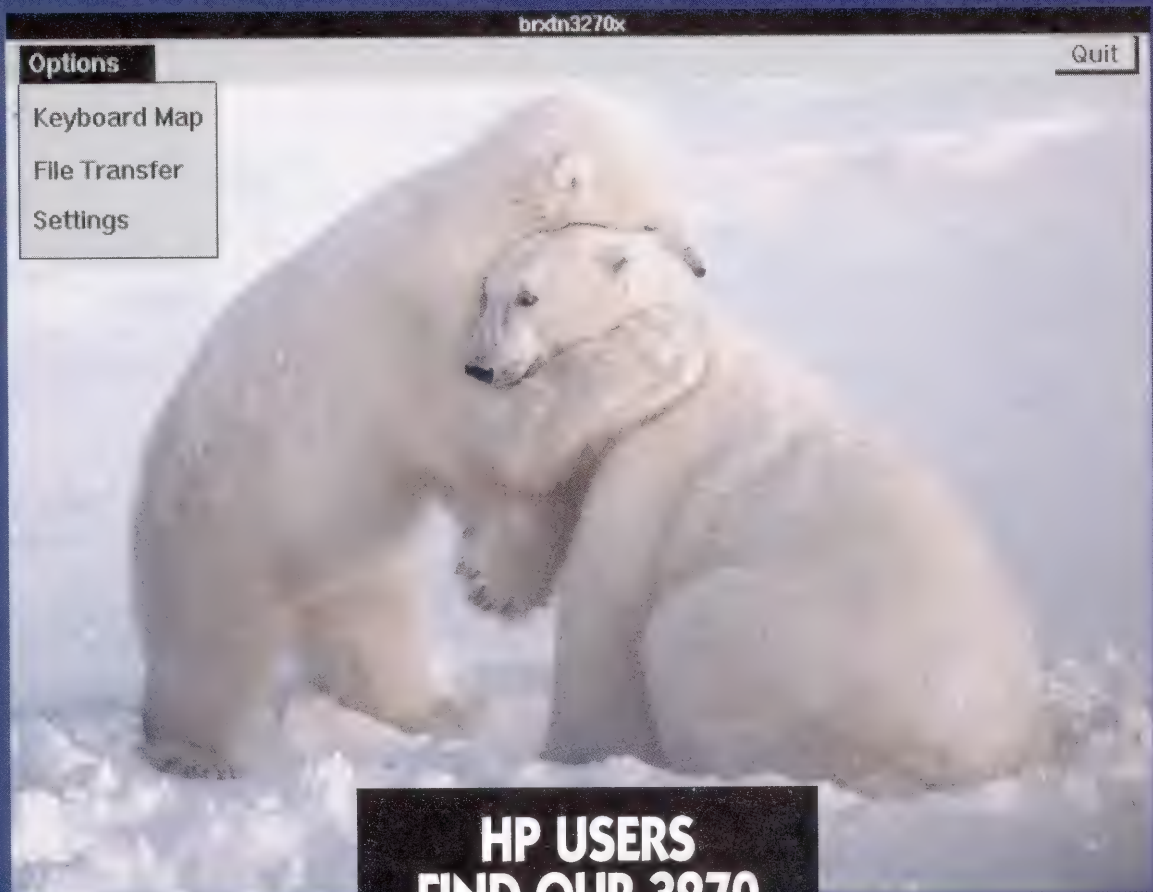
destination address	6 bytes	address data is sent to
source address	6 bytes	address data is sent from
type	two bytes	this is the "length count" in 802.3
data	46-1500 bytes	38-1492 bytes for 802.3, the difference in these two data sizes (MTU) can be seen with the <i>ifconfig</i> command
etc	4 bytes	checksum to detect errors

### Link Layer

In order to connect to other systems local to your system, you use the link layer, which is able to establish a connection to all the other systems on your local segment. This is the layer where you have either IEEE 802.3 or Ethernet. Your HP-UX system supports both of these "encapsulation" methods. This is called encapsulation because your data is put in one of these two forms (either IEEE 802.3 or Ethernet). Data is transferred at the link layer in frames (just another name for data) with the source and destination addresses and some other information attached. You might think that because there are two different encapsulation methods, they must be very different. This, however, is not the case. IEEE 802.3 and Ethernet are nearly identical. This is the reason your HP-UX system can handle both types of encapsulation. So, with the bottom two layers you have a physical connection between your systems and data that is encapsulated into one of two formats with a source and destination address attached. Figure 2 is a list of components of an Ethernet encapsulation, with comments about IEEE 802.3 encapsulation where appropriate.

Note that IEEE 802.3 and Ethernet have different maximum data sizes of 1492 and 1500 bytes, respectively. This





**HP USERS  
FIND OUR 3270  
EMULATION  
VERY COMPATIBLE.**

Like thousands of other HP-UX users, you're sure to embrace the Brx3270 Open Client for HP9000 Series 700/800 workstations, from CNT/Brixton Systems.

One reason is the faithful graphics with full GDDM support. Plus all the other features that let users access mainframe applications easily and productively. Like file transfer, printer support, scalable fonts and an API developer's kit (EHLLAPI).

People also like the friendly GUI design of our emulator, with pull-down menus, X-windows environment, and cut-and-paste between all applications.

And since you want a lasting relationship, the Brx3270 Open Client supports

industry-standard Telnet servers and runs on nearly all Unix systems, not just HP-UX. Since we also offer open software for 5250 emulation, powerful servers and other multiplatform SNA-to-Open Systems solutions, you can standardize on Brixton for all your connectivity needs.

That's why so many of the Fortune 100 are connecting with Brixton. Now it's your turn. Call today for free information. And learn how our "best of breed" software can help you be more competitive.

**The Cross Platform  
Leader**

*Brixton connectivity  
solutions run on:*  
SunOS ■ Solaris 2.x  
IBM AIX ■ HP-UX  
DEC OSF/1  
SCO UNIX ■ UnixWare  
Windows 3.x & NT

1-800-BRIXTON

CNT/Brixton Systems, Inc., 125 CambridgePark Drive, Cambridge, MA 02140 USA

CIRCLE 61 ON READER SERVICE CARD

(<http://www.brixton.com>)  
All trademarks are the  
property of their respective  
owners.



**FIGURE 3** Comparison of Internet Protocol (IP) Addresses

Address Class	Networks	Nodes per Network	Bits Defining Network	Bits Defining Nodes per Network
A	a few	the most	8 bits	24 bits
B	many	many	16 bits	16 bits
C	the most	a few	24 bits	8 bits
Reserved				

class A 0uuuuuuu.....  
 Network Address      Node or Host Address  
 |-----|-----|  
 1 byte                  3 bytes

net.host.host.host

A class A address has the first bit set to 0. You can see how so many nodes per network can be supported with all of the bits devoted to the node or host address. The first bit of a class A address is 0 and the remaining 7 bits of the network portion are used to define the network. There are then a total of three bytes devoted to defining the nodes with a network.

class B 10uuuuuuuuuuuu.....  
 Network Address      Node or Host Address  
 |-----|-----|  
 2 bytes                  2 bytes  
 net.net.host.host

A class B address has the first bit set to 1 and the second bit to 0. There are more networks supported here than with a class A address, but fewer nodes per network. With a class B address two bytes are devoted to the network portion of the address and two bytes to the node portion of the address.

class C 110uuuuuuuuuuuuuuuu.....  
 Network Address      Node or Host Address  
 |-----|-----|  
 3 bytes                  1 byte  
 net.net.net.host

A class C address has the first bit and second bit set to 1 and the third bit is 0. The greatest number of networks and fewest number of nodes per network are associated with a class C address. With a class C address three bytes are devoted to the network and one byte to the nodes within a network.

**FIGURE 4** Address Classes

Address Class	Networks Supported	Nodes per Network	Address Range	
A	127	16777215	0.0.0.1	- 127.255.255.254
B	16383	65535	128.0.0.1	- 191.255.255.254
C	2097157	255	192.0.0.1	- 223.255.254.254
Reserved	---	---	224.0.0.0	- 255.255.255.255

Looking at the 32-bit address in binary form, you can see how to determine the class of an address:

which are sent from port to port. The port used by a program is defined in */etc/services* along with the protocol (such as TCP). These ports are used by network programs such as *telnet*, *rlogin*, and *ftp*. You can see that these programs, associated with ports, are the highest level we have covered while analyzing the layer diagram. I will cover */etc/services* in more detail shortly.

### Internet Protocol (IP) Addressing

The Internet Protocol address (IP address) is either a class "A," "B," or "C" address (there are also class "D" and "E" addresses I will not cover). A class A network supports many more nodes per network than either a class B or C network. IP addresses consist of four fields. The purpose of breaking down the IP address into four fields is to define a node (or host) address and a network address. *Figure 3* summarizes the relationships between the classes and addresses.

These bit patterns are significant in that the number of bits defines the ranges of networks and nodes in each class. For instance, a class A address uses 8 bits to define networks and a class C address uses 24 bits to define networks. A class A address therefore supports fewer networks than a class C address. A class A address, however, supports many more nodes per network than a class C address. Taking these relationships one step further, we can now view the specific parameters associated with these address classes in *Figure 4*.

Looking at the 32-bit address in binary form, you can see how to determine the class of an address as shown below:

*Continued on Page 28*



# HP 9000 SAVINGS

## WORKSTATIONS

705, 19" Color, 16 Mb, 420 Mb Disc  
 710, 19" Color, 16 Mb, 420 Mb Disc  
 715/33, 19" Color, 16 Mb, 525 Mb Disc  
 715/50, 19" Color, 16 Mb, 525 Mb Disc  
 715/64, 20" Color, 32 Mb, 1 Gb Disc  
 715/75, 20" Color, 32 Mb, 1 Gb Disc  
 715/80, 20" Color, 32 Mb, 1 Gb Disc  
 715/100, 20" Color, 32 Mb, 1 Gb Disc  
 725/50, 19" Color, 32 Mb, 525 Mb Disc  
 725/75, 20" Color, 32 Mb, 1 Gb Disc  
 720 CRX, 19" Color, 16 Mb, 525 Mb Disc  
 730 CRX, 19" Color, 32 Mb, 525 Mb Disc  
 735 CRX, 20" Color, 32 Mb, 1 Gb Disc  
 735/125, 20" Color, 32 Mb, 1 Gb Disc  
 750 CRX, 19" Color, 64 Mb, 1 Gb Disc  
 755 CRX, 20" Color, 64 Mb, 1 Gb Disc  
 712/80, 20" Color, 32 Mb, 1 Gb Disc  
 712/60, 20" Color, 32 Mb, 1 Gb Disc  
 WE ALSO SUPPLY SERIES 300 AND  
 400 CPU's AND PERIPHERALS

## X-STATIONS

C2731A Opt. 171 17" Color Envizex Station  
 C2731A Opt. 192 19" Color Envizex Station  
 C2730A Opt. 170 17" Color Envizex Station  
 C2730A Opt. 150 15" Color Envizex Station  
 C2730A Opt. 140 14" Color Envizex Station  
 C2732A Opt. 192 19" Color Envizex Station  
 C2732A Opt. 171 17" Color Envizex Station

## 7XX UPGRADES

705 to 710 Upgrade  
 720 to 730 Upgrade  
 720 to 735 Upgrade  
 730 to 735 Upgrade  
 735/99 to 125 Upgrade

## BACK UP

C1520B, 2 Gb DAT Drive, SCSI  
 C1521B, 4/8 Gb DAT Drive, SCSI  
 C1530B, 8/16 Gb DAT Drive, SCSI  
 C1512A, 1.3 Gb DAT Drive, SCSI  
 C1511A, 1.3 Gb DAT Drive, HPIB  
 7980A/S/XC, Tape Drive

## DISC DRIVES

C3024R, 2 X 2.0 Gb Disc  
 C3028U, 2.0 Gb SCSI add-on  
 C2474S, 1.3 Gb SCSI add-on  
 C2217T, 1.3 Gb SCSI Mini-tower  
 C2438A, 2.0 Gb Fast wide  
 We Carry all Optical and CD-ROM Drives

## PRINTERS

256X Line Printers  
 293X Line Printers  
 2235A/B/C/D  
 LaserJets  
 DeskJets  
 Plotters

## MEMORY

A2218A, 32 Mb for 705, 710  
 A2816A, 16 Mb for 725  
 A2518A, 128 Mb for 720, 730, 735, 750, 755  
 A2513A, 64 Mb for 720, 730, 735, 750, 755  
 A2512A, 32 Mb for 720, 730, 735, 750, 755  
 A1979A, 16 Mb for 720, 730, 735, 750, 755  
 A2829A, 32 Mb for 712/60, 712/80  
 A2827A, 64 Mb for 712/60, 712/80  
 A2516A, 128 Mb for 8X7  
 A2511A, 64 Mb for 8X7  
 A2232A, 32 Mb for 8X7  
 A2231A, 16 Mb for 8X7

## PROCESSORS

927 to 987 Systems  
 800 Series Business Servers



**ABTECH**

**CDLA** Member:  
 The Computer Leasing &  
 Remarketing Association

For eight years, ABTECH has provided the Hewlett-Packard community with quality new and refurbished 3000, 9000 and 1000 series systems and peripherals. All of our equipment is thoroughly tested by our service engineers, and guaranteed for HP Maintenance. And because we also purchase equipment, we can customize the best solution to meet your computer requirements. Whether you're adding a peripheral or upgrading your entire system, ABTECH can provide a plan for you.

Call ABTECH Toll Free

**1-800-474-7397**

10211 Pacific Mesa Boulevard Suite 409, San Diego California 92121

1-800-474-7397 (619) 450-6992 FAX (619) 622-0350

abtech@powergrid.electriciti.com

**In Europe** Call ABTECH EUROPE @ 33-1-4723-5022

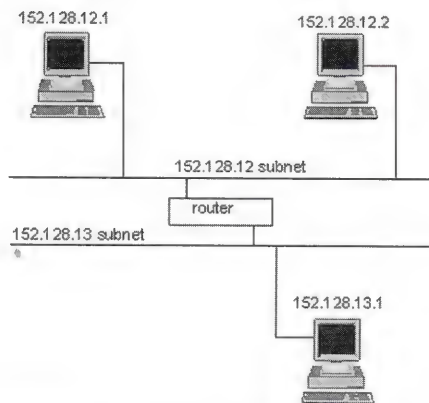
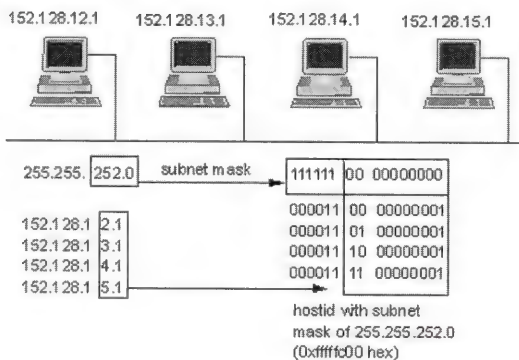
CIRCLE 52 ON READER SERVICE CARD





**FIGURE 5** Example of Using Subnet Mask to Compare Addresses

	address of system on subnet 12			
decimal	152	128	12	1
binary	10011000	10000000	00001100	00000001
	network addresses are the same		subnet id's are different	host id's don't matter
subnet mask	11111111	11111111	11111111	00000000
decimal	10011000	10000000	00001101	00000001
binary	152	128	13	1
	address of system on subnet 13			

**FIGURE 6** Class B Systems on Different Subnets**FIGURE 7** Future Expandability Using Subnet Mask

### Subnet Mask

Your HP-UX system uses the subnet mask to determine if an IP datagram is for a host on its own subnet, a host on a different subnet but the same network, or a host on a different network. Using subnets, you can have some hosts on one subnet and other hosts on a different subnet. The subnets can be separated by routers or other networking electronics that connect the subnets.

In order to perform routing, the only parts of an address your router uses are the net and subnet. The subnet mask is used to mask the host part of the address. Because you can set up network addresses in such a way that you are the only one who knows which parts of the address are the host, subnet, and network, you use the subnet mask to make your system aware of which bits of your IP address are for the host and which for the subnet.

In its simplest form, what you are really doing with subnet masking is indicating which portion of your IP address defines the host, and which part defines the network. One of the most confusing aspects of working with subnet masks is that most books will show the following subnet masks as the most common:

Address Class	Decimal	Hex
A	255.0.0.0	0xff000000
B	255.255.0.0	0xffff0000
C	255.255.255.0	0xffffffff

This, however, assumes you are devoting as many bits as possible to the network and as many bits as possible to the host and no subnets are used. Let's take a look at an example of using subnetting with a class B address.

Address Class	class B		
host IP address	152.128	12	1
breakdown	network	subnet	hostid
number of bits	16 bits	8 bits	8 bits
subnet mask in decimal	255.255	255	0
subnet mask in hex decimal	0xffff0000		
Example of different host on same subnet	152.128	12	2
Example of host on different subnet	152.128	13	1

In this example the first two bytes of the subnet mask (255.255) define the network, the third byte (255) defines the subnet, and



the fourth byte (0) is devoted to the hostid. Although this subnet mask for a class B address did not appear in the earlier default subnet mask table, the subnet mask of 255.255.255.0 is widely used in class B networks to support subnetting.

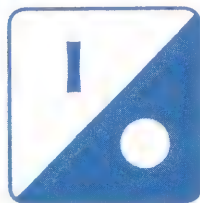
How does your HP-UX system perform the comparison using the subnet mask of 255.255.255.0 to determine that 152.128.12.1 and 152.128.13.1 are on different subnets? Figure 5 shows this comparison.

The diagram in Figure 6 shows these two systems on the different subnets. You don't have to use the 8-bit boundaries to delineate the network, subnet, and hostid fields. If, for instance, you wanted to use part of the subnet field for the hostid, you could do so. A good reason for this would be to accommodate future expandability. You might want subnets 12, 13, 14, and 15 to be part of the same subnet today and make these into separate subnets in the future. The example in Figure 7 shows this.

These systems are connected to the same subnet even though part of the third byte, normally associated with the subnet, is used for the hostid. In the future, the subnet mask could be changed to 255.255.255.0 and have four separate subnets of 12, 13, 14, 15. This would require putting routers in place to route to these separate subnets.

*To be continued in the next issue.* ■

*Marty Poniatowski is a technical consultant with Hewlett-Packard. He is author of The HP-UX System Administrator's "How To" Book, published by Prentice Hall, which can be ordered by calling (203) 377-4746.*



# I/O Data Systems, Inc.

Buy - Sell - Lease - Trade  
**HEWLETT-PACKARD**  
Systems, Workstations  
Peripherals & Solutions

**NOW FEATURING**

**Fax-on-Demand & Interactive Voice Response Solutions**  
**For your Hewlett-Packard System or PC Network**



Channel  
Partner

**(216) 835-2211**

27378 W. Oviatt  
Bay Village, OH 44140  
FAX: (216) 835-0220

CIRCLE 105 ON READER SERVICE CARD

## Migrating to HP-UX? Looking For A Full-Screen Editor?



If you are familiar with HP's Edit/3000 or IBM's SPF editor, you already know how to use Qedit's basic editing commands. Qedit's full-screen mode uses all the functions of your HP terminal or emulator, so there are no complex and error-prone key sequences to learn.

And if you already use Qedit on the HP 3000, you'll love Qedit on HP-UX because Qedit has the same full-screen and command modes that you already use. You can be productive immediately.

With Robelle, you always get support you can count on. When you are on service with us, you receive more than just an enhanced version of Qedit once a year. You get fast, responsive service by telephone, fax, or e-mail. You'll also receive a subscription to our famous *What's Up, DOCumentation?* newsletter, full of tips, tricks, and news about the HP world in general.

**CALL TODAY FOR YOUR FREE EVALUATION COPY**

**Robelle**  
CONSULTING LTD.

Official Robelle Distributors

Australia, New Zealand.....61 2 484 3979  
Central America.....502 2 314786  
Czech, Slovak Republics.....42 2 723 432  
France, Belgium.....33 1 69 86 60 00  
Germany.....49 7621 780 41

Unit 201, 15399-102A Ave.  
Surrey, B.C.  
Canada V3R 7K1

Greece, Italy.....30 1 777 0561  
Holland, Belgium.....31 4242 15655  
Hong Kong.....852 2609 1338  
Mexico.....52 5 813 1325  
Saudi Arabia, U.A.E.....966 1 477 4555

Phone: **(604) 582-1700**  
Fax: **(604) 582-1799**  
E-mail: **info@robelle.com**

Scandinavia.....46 8 623 00 50  
Singapore.....65 441 2688  
South Africa.....27 21 61 9001  
Switzerland, Austria.....41 31 981 06 66  
Taiwan.....886 2 545 2166  
United Kingdom, Ireland.....44 171 473 2558

Qedit is a trademark of Robelle Consulting Ltd.

CIRCLE 4 ON READER SERVICE CARD



# Product Review

by Greg Cagle

## Z-Mail

IN TODAY'S WORKPLACE, ELECTRONIC mail is critical to productivity. Many UNIX mail systems are now being designed in two parts: the MTA (Mail Transport Agent) and MUA (Mail User Agent). On UNIX systems, the MTA is generally a combination of the standard UNIX *sendmail* daemon and SMTP (Simple Mail Transport Protocol). SMTP is the default transport agent for the Internet.

The choice of an MUA for UNIX platforms can be complex. Historically, UNIX users have used public domain software, such as *mail*, *mailx*, *mh*, *mush*, and *elm*. These packages either have line-oriented interfaces or use the curses package to manage a menuing interface. The proliferation of X11 workstations and X terminals and the example of Sun's mailtool under OpenWindows made X/Motif point-and-click interfaces popular, and it was only a matter of time until a commercial X/Motif MUA for UNIX platforms appeared. One of the currently popular X/Motif MUAs is Z-Mail, from Z-Code Software, a division of NCD, Inc. Not surprisingly, it is shipped with NCD X terminals, and a version is also bundled with SGI workstations. Additionally, it is available for most popular UNIX platforms, as well as Windows and the Macintosh (using POP-3 or Z-POP). The version reviewed for this article is Z-Mail 3.0.1, running on an HP 735 at HP-UX 9.05 and HP-VUE 3.0.

### Features

#### X/Motif Interface

The user interface provided by Z-Mail is intuitive and a good example of Motif style. The main window (*Figure 1*) displays a menu bar and the following optional areas: a folder status line, a

folder selection panel, a message summary list, a button panel, an output log, and a command input area. The menu bar and the button panel can be customized. Double clicking on a message summary brings up the referenced message in a display window (*Figure 2*), which itself has a fully customizable menu bar and button panel. One limitation is that you can't display more than one folder at a time, or at least I couldn't find a way to do it. You can have more than one folder open, but only one displayed in the main window. Another feature I found mildly (but not seriously) annoying is the use of a scrollable list for address input. The composition window (*Figure 3*) uses the scrollable list in the upper right corner for input into both the To: and CC: fields; when either field is selected, Z-Mail parses the address list into the scrollable list window. I found that when I wanted to edit an address in the To: list, for example, I had first to select the To: field, then scroll the list to the entry I wanted, select it, and then press the Edit button, which brought the entry into the To: field for editing. Seems like a lot of work.

#### Full MIME Capability

Z-Mail fully supports multimedia mail with MIME. The key here is whether other MUAs that support MIME can successfully exchange MIME messages with Z-Mail. I was able to compose and receive MIME messages (containing image and sound components) with ismail, dtmail, and HP's Mpower enhanced elm successfully. MIME decoding and encoding is controlled by a file in the main Z-Mail directory called *attach.types*. You can "make user-specific customizations to this file if you want. For example, I customized it to use *imageview* instead of *xv* to display JPEG files.

*Continued on Page 32*

### At-a-Glance

#### Z-Mail 3.0.1

Network Computing Devices  
Z-Code Software Division  
101 Rowland Way #300  
Novato, CA 94945  
Phone: (415) 898-8649  
Fax: (415) 898-8299  
e-mail: info@z-code.com  
Web: <http://www.ncd.com/zcode.html>

#### Price

\$165/seat for 1 to 5 users  
Evaluation kits are available for \$50.



# CHANGE OF PLANS !

*Change to Plan-B for host-based client/server PC network backup*

	Plan-A (THE OLD WAY)	PLAN B
<b>Completeness</b>	"We only back up our PC servers. We don't worry about data on users' PCs."	"Plan-B backs up all our PCs and PC servers, or whichever PCs we specify."
<b>Automation</b>	"Users perform their own backups. We give each one a box of floppy disks and they come to us when they need more."	"We used Plan-B's scheduler to automatically back up our PCs to our HP9000's DDS drive at night."
<b>Convenience</b>	"We have someone who comes in at night and carries a Trakker to each PC and backs them up one-by-one during the night. Users fill out a form if they need a file restored, and our night person restores the file."	"Plan-B backups are done with no user or operator intervention. The PC data is written to tape as part of our HP9000 backup. Users have a program on their PCs which they use to restore any file, any time, in seconds."
<b>Control</b>	"Users are supposed to back up their own PCs. We tell them to put important files on the file server anyway."	"Plan-B meets our auditor's requirements for ensuring that all corporate data is safeguarded."
<b>Integrity</b>	"We are not concerned about data consistency between PCs and the HP9000. Our client/server applications have not been implemented yet."	"Plan-B is the only backup package we found that supports our client/server environment, in which interrelated data is contained on PCs and the HP9000."
<b>Security</b>	"Users keep their backup diskettes in their desk drawers."	"With Plan-B, our PC backups are as reliable and secure as our HP9000 backups."
<b>Performance</b>	"PCs with large disk drives can take a very long time. We tried doing a PC network-based backup but it was way too slow."	"Plan-B's speed blows everything else away, since it uses the horsepower of our HP9000 system and backs up multiple PCs concurrently."

**CALL YOUR ORBIT REPRESENTATIVE FOR MORE INFORMATION OR A FREE DEMO**

DATA PROTECTION BY

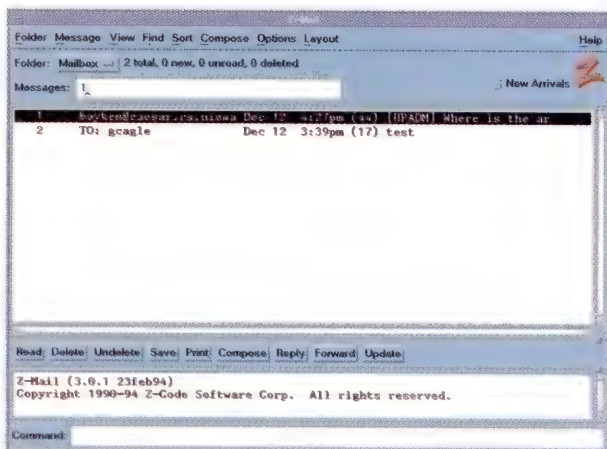
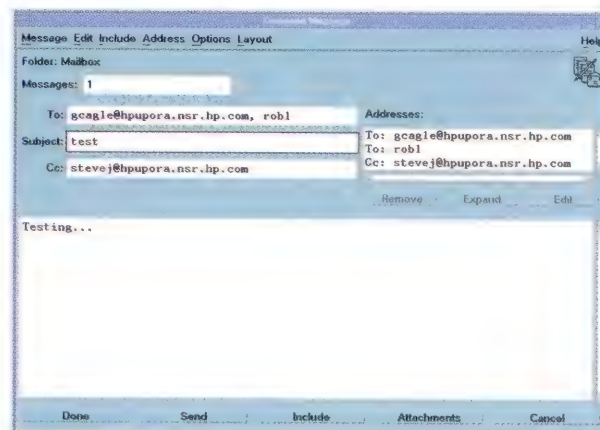
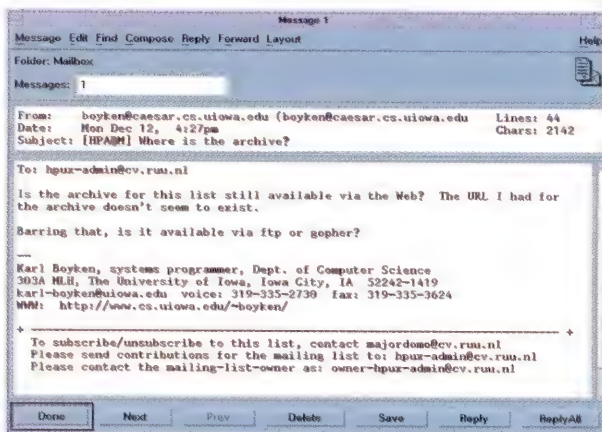
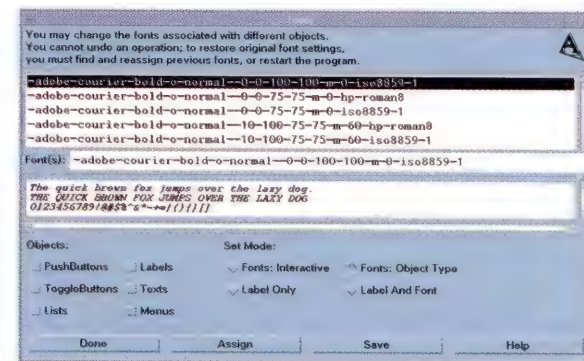


ORBIT SOFTWARE, 315 DIABLO ROAD, DANVILLE, CA 94526 U.S.A. (800) 6-ONLINE or (510) 837-4143, FAX (510) 837-5752

ORBIT Benelux	ORBIT France	ORBIT Germany	ORBIT Italy	ORBIT Scandinavia	ORBIT UK	ORBIT Far East
(Utrecht)	(Nantes)	(Berlin)	(Milan)	(Helsinki)	(London)	(Singapore)
(31) 34 65 53 884	(33) 40 25 16 50	(49) 30 852 70 97	(39) 2 33 41 21	(358) 0 638 450	(44) 372 360333	(65) 227-6959
fax 34 65 54 101	fax 40 25 16 52	fax 30 852 70 35	fax 2 33 41 23 33	fax 0 638 445	fax 372 360305	fax 227-6867

CIRCLE 26 ON READER SERVICE CARD



**FIGURE 1** Main Window**FIGURE 3** Composition Window**FIGURE 2** Message Display Window**FIGURE 4** Options Menu**FIGURE 5** Toolbox

### Extensive Customization Capability

You can spend a lot of time customizing Z-Mail. Almost anything you would want to do is available from the Options menu, including color and font customization (Figure 4). You can easily add, delete, or modify buttons from the main window button bar as well as the compose and message window button bars. All menus are completely customizable from a dialogue box. Scripts and functions can also be implemented from the Options menu. Runtime behavior of the program is controlled by numerous startup variables; these



are editable and savable across sessions from the Variables dialogue box. One example of this is the variable “presign,” which causes a defined signature file to be preloaded into the composition window, instead of just appending the file when the message is sent.

The customization functions are also collected in the Toolbox (*Figure 5*) for easy access; this is convenient if you frequently change customization settings.

### ***Scripting Capability***

Z-Mail supports a mail scripting language called Z-Script. It allows power users to create their own functions (which can then be tied to a menu pick or button). An example of a trivial function:

```
ask -input patchno "Enter patch number"
if $status == -1
    return
endif
sh echo "send $patchno" >> $tmpdir/patch$$
mail -s $patchno -H $tmpdir/patch$$ -u -l -U support@support.mayfield.hp.com
sh rm $tmpdir/patch$$
```

The purpose of this function is to generate a mail message to the HP SupportLine mail server to order a patch via e-mail. The function can then be tied to a button on the front panel, for example. The function asks for the patch number, which is stored in a variable (“patchno”). It creates a temporary file with the text required to get the mail server to send the patch requested and then mails the file to the proper address using the “mail” script command.

### ***Flexible Searching and Sorting***

Sorting is supported on date, subject, author, message length, priority, and status. You can also customize and combine the sort parameters. Searching is supported by subject, author, message ID, priority, and mark by default. Very flexible pattern and date searches are also available, with optional actions to be performed on matches. Z-Mail also allows you to assign priorities to messages and sort them accordingly. One limitation is that you can’t search multiple folders or trees of folders.

### ***Filtering***

Z-Mail provides filtering capabilities that allow automatic functions to be performed based on user-defined criteria. Examples include autoforwarding of certain messages, or autodeletion of junk mail. It’s a matter of a few button clicks to set up a filter to autosave all mail from a certain person to a particular folder, for example.

### ***Aliases and Address Management***

Z-Mail manages aliases as you might expect in a fairly obvious one-to-one correspondence. It also provides the concept of an address book, which supports flat file searches, NIS searches, X.500, or the output of a custom program. The address

browser allows customizable searches of the address book, as well as automatic address checking of the message composition address fields. One of the default actions is to search `~/addresses`; it was trivial for me to link that file to our site alias file and quickly enable that as an address book.

### ***Online Context-Sensitive Help with Hypertext***

Z-Mail supplies extensive online help with hypertext. It appears to fully supplant the hardcopy documentation, and I see no need to purchase the hardcopy manuals, especially since they don’t have hypertext.

### ***Floating Licenses***

Z-Mail uses NLS, the Network Licensing System to manage floating licenses within a network. Some level of thought should be applied to the setup and configuration of the license server and its role within the network architecture on site. At our site there are over a thousand licenses served from a single server. Note that Z-Mail does periodic license checks while the application is up.

### ***Multiplatform Support***

The 3.0.1 CD distribution contains Z-Mail for the following platforms:

- IBM RS/6000 AIX 3.2.2
- IBM RS/6000 AIX 3.2.5
- HP 9000/s800 HP-UX
- HP 9000/s700 HP-UX
- Motorola 88K 88open
- Motorola 88K R40
- MIPS RISC/OS 4.52
- 80486 NCR 3300 SVR4.0
- DEC Alpha OSF/1 V1.3
- 80386 SCO ODT 3.2
- Sequent PTX 2.0
- SGI R3000 IRIX 4.0



SGI R3000 IRIX 5.1  
 Sun Sparc Solaris 2.2  
 Sun Sparc Solaris 2.3  
 Sun Sparc Solaris 4.1  
 DEC MIPS Ultrix 4.2

The following additional platform versions are available via FTP:

HP Apollo Domain/OS  
 HP 9000/s300 HP-UX  
 80386 Interactive UNIX  
 Pyramid OSx (BSD/SVR3)  
 Pyramid DC/OSx (SVR4)  
 40386 UnixWare SVR4.2

There are also Mac and PC versions available using POP-3 or Z-POP; currently they have platform-specific user interfaces, but the next release should have a common user interface with the UNIX versions.

The bottom line here is that Z-Mail can be a good corporate e-mail solution in situations where supporting multiple platforms is important.

## Installation

Installation is fairly typical in my experience for UNIX applications. Z-Mail is distributed on a CD-ROM (and other media), which contains all UNIX versions of Z-Mail and PostScript versions of the three manuals, as well as a plain text version of the installation manual. Z-Mail is also available as a compressed tar file via FTP from <ftp://ftp.ora.com/pub/z-code/zmail/3.0>. An installation shell script is provided. On disk space usage is just under 8 MB for the standard installation. I did not perform the license server installation and configuration. Note that Z-Mail is statically linked and thus is not dependent on X11 or Motif shared libraries

that may change. Z-Mail likes to be installed in `/usr/lib/Zmail`, although that is configurable. Note also that in order to send mail, you must start *sendmail* using SAM if you have not already done so.

## Usability

Z-Mail is very easy to use for both novice and power users. Additionally, the ease of customization is noteworthy. This is one of the few X/Motif applications I've seen where changing the colors and fonts on the fly is supported, if a little difficult to figure out.

Compatibility with other MUAs is everything that can be expected. Z-Mail supports the standard UNIX mail file format, and will read and convert mh folders if required. One minor issue arises with the usage of folder indices; Z-Mail uses them to speed up access to large folders. Unfortunately, other MUAs don't know about the indices, so if you switch back and forth, the indices can get out of sync with the folder.

## Reliability and Performance

Z-Mail 3.0.1 has been absolutely reliable throughout the test period. Performance is as good as any MUA I've seen. The use of folder indices can speed things up significantly, at the risk of incompatibility with other MUAs as mentioned previously. Extremely large mail messages (upwards of 50,000 bytes) are displayed within three seconds on the tested configuration. Updates of large folders consisting of several hundred mail messages located on a local disk took two seconds on average. I have not seen a situation where Z-Mail's performance is in any way an issue.

## Supportability

Z-Code supports Z-Mail with both e-mail and phone support for licensed customers for a 30-day period after purchase. After that point, customers can purchase annual support contracts covering phone, fax, and e-mail support plus free maintenance releases and half off new versions. Customers also can purchase "Premium Technical Support," which provides free new versions.

Hardcopy documentation consists of a *User Guide*, an *Installation Guide*, and a *Reference Manual*. Extensive online help is also available, and PostScript versions of the manuals are included on the CD-ROM distribution. O'Reilly also publishes a Z-Mail book.

## Summary

I consider myself a mail power user; I send and receive a lot of e-mail and require a lot from an MUA. I've tried all the public domain packages there are and Z-Mail is clearly a cut above anything currently out there. I have also casually evaluated ismail (from Hal Software) and dtmail, the multimedia mailer bundled with the November CDE snapshot. ismail is quite close to Z-Mail in many areas but is less suited to power users, because it lacks scripting capabilities and other "power" features. dtmail is a viable alternative to either Z-Mail or ismail, but also lacks power features and customization capabilities. And it's not a real supported product (yet). ■

---

*Greg Cagle is a technical consultant with HP's Professional Services Organization, specializing in HP-UX and workstations. In his spare time he is a member of the Board of Directors of InterWorks, the HP Workstation user group. He can be reached at (503)598-8205 or [gcagle@hpupora.nsr.hp.com](mailto:gcagle@hpupora.nsr.hp.com).*



# THE TOTAL SOFTWARE CONFIGURATION MANAGEMENT PACKAGE




**VCS** provides Software Configuration Management solutions designed to enhance software development in the MPE, Unix and DOS environments. These solutions extend across the entire software cycle from the original analysis, through design, implementation, testing, distribution, and continued maintenance.

Our products are fully integrated to effectively bring order and control to the chaos that accompanies all significant software development. They improve software quality, increase productivity, improve project communication, enforce standards, automate software implementation and distribution processes, provide security and auditing, and report on the entire process from the historical perspective.

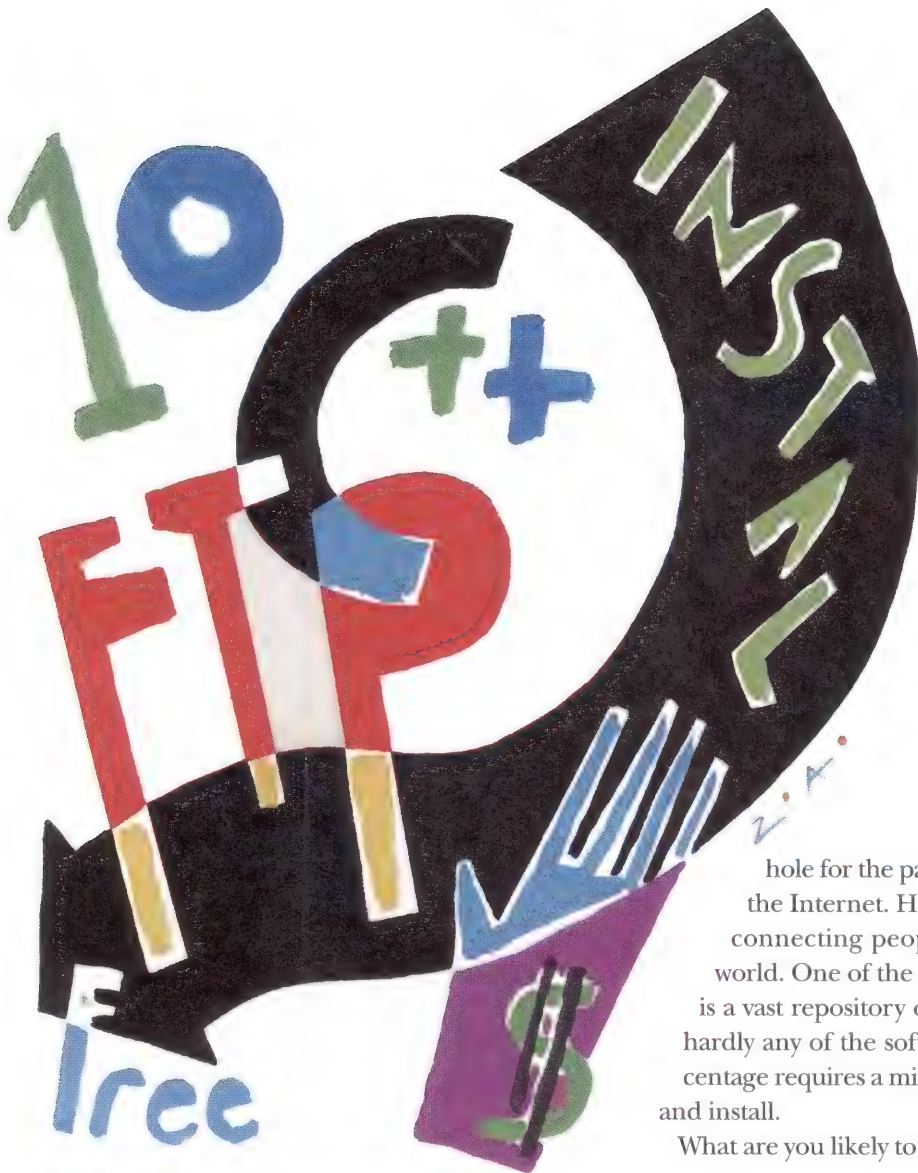
Please call to discuss your particular software configuration requirements.

## 1-800-DOC-VCS-1

 *Diamond Optimum Systems, Inc.*

22801 Ventura Boulevard, Suite 105 ♦ Woodland Hills, California 91364 ♦ (818) 224-2010 ♦ Fax (818) 224-2009

CIRCLE 121 ON READER SERVICE CARD



by Sean Reifschneider

Unless you've been living in a hole for the past year, you've probably heard about the Internet. Hundreds of thousands of computers connecting people at work and home all over the world. One of the things the Internet has evolved into is a vast repository of publicly available software. While hardly any of the software is "ready to run," a large percentage requires a minimal investment of time to compile and install.

What are you likely to find on the Net? Here's a sampling:

- **nvi** A new version of the vi editor from Berkeley that includes unlimited undo/redo, multiple windows, and more.
- **gzip** A non-patented replacement for the UNIX compress routines. Handles files with .gz extension that you're likely to find at many archive sites.
- **ghostscript** An interpreter that takes PostScript input and produces native printer language output for various non-PostScript printers.
- **GNUCC** A full C/C++/Objective C compiler. Very useful if you have the crippled compiler shipped with HP-UX.
- **XV** An X image viewer supporting many file formats and image manipulation functions.
- **XPilot** A multi-player network game. Warning: Severely addictive!



# Building Programs from the

# INTERNET

## The Starting Point

Most of the applications on the Net are written in ANSI C. All HP-UX machines come with a C compiler, but the standard compiler is included mainly to enable you to rebuild the HP-UX kernel. If you don't have access to the HP ANSI C compiler, there are still options. The Free Software Foundation's C (GNUCC) compiler will compile with the standard HP compiler, and a pre-built version is available for the Series 700 workstations (see FTP Sites list).

The next most important tool to have when building software from the InterNet is *gzip*. Archive sites often store their files compressed using either the UNIX *compress* utility (files with *.Z* extension) or with *gzip* (with *.gz* extension). You can find *gzip* at any GNU archive location (see FTP Sites list) and many other archive sites. Most software is distributed in a compressed tar file. Once it has been decompressed, you will need to dearchive it using *tar* (see the manual page for *tar(1)*).

This article can't cover how to build all available software, but at least general information on building and installing is included with the software. Look for files called *README* or *INSTALL*, which will probably have all but the most specific information on how to get the program running on your computer.

## Doing the Build

Recently software has started being distributed with "Configure" scripts that can figure out what needs to be done to get the program to compile successfully. These scripts will search the computer to find libraries that need to be included and macros to define for the compiler. I have found that if there is a file named *Configure* in the top-level directory, more often than not I can get the package to compile without having to read the directions in *INSTALL* or *README*.

If you are trying to build a package that doesn't have automatic configuration, you will usually have to read the *README* or *INSTALL* documents. You may have to modify

a header file or change flags in the *Makefile* to configure the software before doing a compile. This all should be discussed in *README* or *INSTALL* and will be different for every package.

Unlike most other vendors, HP's ANSI compiler defaults to using old-style (K&R) C and ANSI must be enabled with the *-Ae* flag. Most software assumes that *cc* runs as an ANSI compiler. You will need to find a line similar to

```
CC=cc
```

in the *Makefile* and change it to

```
CC=cc -Ae
```

for HP's ANSI compiler and

```
CC=gcc
```

for GCC.

Changing the definition of *CFLAGS* to

```
CFLAGS=+O4
```

for HP's ANSI or

```
CFLAGS=-O2
```

for GCC compilers will activate their maximum optimization modes. HP's compiler consumes *huge* amounts of memory with *+O4*, which may cause some compiles to run out of memory. Substituting *+O3* reduces the amount of memory used (by producing less optimal executables).

Once the configuration (automatic or manual) is complete, you are ready to type *make*. If all goes well, the end result

will be an executable copy of the program. Some packages require that support files be installed in a known location (usually specified during the configuration step) and won't run until these have been installed. Usually, though, it is harmless to try the program once it's compiled.

### Installing the New Software

Once the program has been compiled, the next step is usually to *install* the program so that users can access it. If you are building the program for your own use only, this may be as simple as copying it to your own *bin* directory.

If you plan on loading many packages, you will probably want to come up with a plan on where to load them. I use the directory */usr/local* as the tree to install all software I've built. Binaries go in */usr/local/bin*, libraries in */usr/local/lib*, etc. This prevents confusion with binaries that were shipped as a part of the OS.

It's very important on a multi-user system to ensure that this directory not introduce security holes into the system. My practice is to install all files and directories with an owner and group of *bin* and mode 755 for binaries and directories and 644 for other files.

Using the command *make install* will copy the program and any associated files into the directories chosen during the configuration stage. If the package doesn't have an install target in the *Makefile*, you'll again have to resort to reading the documentation that came with it. Most of the cases I've seen in which install support wasn't included were very simple programs that just required you to copy the binary into its final resting place.

### What If It Doesn't Work?

The quality of software available is amazingly high considering that most of it is free. Sometimes you do get what you paid for, though—many packages don't work or core dump when you try to use them. Time spent on verifying that the configuration was done properly may turn up the problem. If it's a piece of software you really need to use, you might spend some effort on debugging it, or contact the author and see if there's any interest in working with him to fix any problems.

In the most extreme case, you will just remove the program. This is most easily done if you can verify that it doesn't work before you have completed the install. If the program is found to be unsuitable after the *make install*, you will need to find where it copied all the files so you can get rid of them. If at all possible, test *before* you complete the install.

#### FTP SITES

jaguar.cs.utah.edu

prep.ai.mit.edu

ftp.cae.wisc.edu

iworks.ecn.uiowa.edu

GnuCC pre-built for the Series 700

GNU software site

U.S. Mirror of University of Liverpool HP-UX Porting & Archive Centre

InterWorks HP User Group archive site

### Licensing

It is your responsibility to find out what restrictions there are on use of the program. These should be detailed in one of the document files included with the software—often in a file called *COPYING* or *LICENSE*.

The single most used license is the GNU Public License, which is designed to guarantee that free software remains free. There are many different licenses that may restrict your use of the software to varying degrees. Be especially careful if you plan to use the software in a commercial environment—some software expressly restricts this.

### X Window Software

X Window packages differ from others in that they usually have an *Imakefile* that describes what needs to be done to build a *Makefile*. The *Makefile* is generated using a tool called *imake*, which HP does not include. In fact, without the X developers kit, HP doesn't provide most of what you need to build X Window programs.

The libraries and headers needed to make X programs, as well as *imake*, are available from the InterWorks FTP site (see FTP Sites list). Setting up *imake* is non-trivial but can be accomplished with the assistance of the included *README* files.

### In Closing

The current trend on the Internet seems to be towards higher and higher quality software that's as close to trivial to build as you can expect. There is a wealth of programs available out there that greatly extend the usefulness of HP-UX systems. A minimal investment of time in the short term can produce huge savings in the long term. ■

*Sean Reifschneider <jaf@Tummy.com> is currently working as an HP-UX Systems Administrator with experience in writing maintainable software in C, and far too many hours spent building software he's gotten from the Net.*



## Interex is your HP-UX advocate

**ad • vo • cate:** to plead in favor of, *see support*

HP-UX users can rely on Interex, a 7,500-strong membership organization, as a powerful channel to Hewlett-Packard. Interex is committed to supporting HP-UX users through volunteer committees and special interest groups:

**SIGUNIX**—The Special Interest Group for UNIX, meets at the annual Interex HP Computer Users Conference to discuss areas of concern unique to HP-UX users and to share solutions.

### Systems Improvement

**Committee/HP-UX**—The SIC HP-UX pinpoints specific user needs for the HP-UX operating system and presents its requests for system upgrades, etc. to Hewlett-Packard.

### Advocacy Coordinating

**Committee**—The Advocacy Coordinating Committee facilitates communication between HP-UX users and Hewlett-Packard, enabling users to have specific concerns referred directly to the accountable HP entity. This committee tracks and manages all advocacy requests and publicly discloses the outcome of all advocacy issues.

**INTEREX**

*The International Association of  
Hewlett-Packard Computer Users*

# MULTIPLE emulations

**FOR MIXED  
ENVIRONMENTS  
WITH SIMILAR 'LOOK & FEEL'**

PERICOM's **teem** range of connectivity software tools will help protect your company's investment in

existing application software. **teemtalk** for the Microsoft® Windows™ operating system and **teem-X** for the X Window System allow access to an entire mainframe

world, enabling the widest range of PCs using Microsoft® Windows™ and X Window-based display stations including DEC, IBM, HP, Silicon Graphics and Sun to emulate the widest range of terminals.

**teem** products feature flawless emulation of industry standard text and graphics terminals including:

DEC VT100, 220, 320 & 340 (ReGIS)	Prime PT250
IBM 3270	Retrographics VT640
Tektronix 4010, 4014, 4207 & 4111	Tandem 6526, 6530
HP 2392A, 2622A, 700/92	Westward 2119, 3220
	Viewdata

And PERICOM connectivity doesn't stop there. **teem** products also provide advanced connectivity and productivity features including:

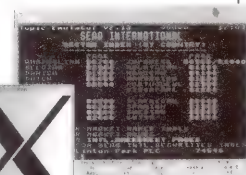
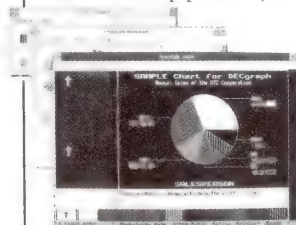
File transfer	Dynamic window sizing
Scripting language	Dynamic Data Exchange
Auto colour mode	Cut and Paste
Programmable soft buttons	Extensive network support

So for cost-effective terminal emulation that makes the most of your IT investment, call PERICOM now! (DOS products also available)



Pericom Inc  
9 Princess Road, Suite D  
Lawrenceville, NJ 08648, USA  
Tel: 609 895-0404 Fax: 609 895-0408  
UK Tel: + 44 (0)908 265533  
France Tel: 1 30.61.50.25  
Germany Tel: 02 14/50 61 66  
Singapore Tel: 278 6545/6  
E-Mail: barryb@pericom-usa.com

Microsoft is a registered trademark and Windows and the Windows logo are trademarks of Microsoft Corporation. All other trademarks acknowledged. **teemtalk** and **teem-X** are trademarks of PERICOM SOFTWARE PLC





# Book Review

by Chris Curtin

THE SECOND EDITION OF the "Granddaddy" of all UNIX system administration books, *UNIX System Administration Handbook*, second edition, presents an easy-to-read, easy-to-understand, no-holds-barred approach to system administration. Unlike most other books in this category, the *Handbook* addresses many of the UNIX variants available today.

The book addresses six of the most common UNIX versions and points out the unique features of each as a topic is covered. The versions covered are Solaris 2.4, HP-UX 9.0, IRIX 5.2, SunOS 4.1.3, DEC's version of OSF/1 2.0, and BSD/OS 1.1. The authors take the occasional jab at others, such as SCO and IBM's AIX, but always in jest.

The first thing you'll notice when you receive the book is the CD-ROM. Rather than just writing about the limitations of the vendor-supplied programs or this great public domain program that you must have (which requires a direct Internet connection and several hours of FTP access to get), they include a CD-ROM packed with what the authors consider essentials for properly managing a system. After reviewing the list of programs included, I agree that you need them! I certainly did.

The book is divided into three sec-

tions: Basic Administration, Networking, and Bunch o' Stuff. The first section, Basic Administration, covers the basics of setting up and managing a UNIX system. Topics covered include starting the system, shutting it down, adding users, adding disks, controlling processes, developing a backup scheme, and reconfiguring the Kernel.

The second section, Networking, is worth the price of the book alone. The authors start with an overview of networking, protocols, and networking hardware. They do not assume that you are familiar with the jargon and acronyms. Additional sections cover NFS, DNS, SLIP/PPP, and sendmail. The last chapter in this section covers security and is required reading if you are thinking about connecting to the Internet. If you are already connected, read this section first!

The third section, Bunch o' Stuff, covers the remaining tasks an administrator must perform, as well as some areas you may not have thought about. A good section on a huge topic, Usenet News, gives a useful introduction to newsgroups and provides a starting point for the list of groups an administrator should read and be involved with.

Printing and Imaging is included in this section, but I think this topic belongs with Basic Administration. I know that I spend a fair amount of time fooling around with printers when getting a system set up. Other topics in this section address hardware maintenance, disk space maintenance, and the accounting system. Also included is a very good section on configuring and using UUCP.

The second to last chapter is one that I read with great interest: Daemons. The authors describe each of the major

Title	<i>UNIX System Administration Handbook</i> , second edition
Author	Evi Nemeth, Garth Snyder, Scott Seebass, and Trent R. Hein
Publisher	Prentice Hall PTR 1995, 758 pages ISBN: 0-13-151-51-7 US \$48



# STAY ON COURSE! WHILE WE DO THE MONITORING



Tired of checking in on weekends or nights to verify that your data center is running as planned, when you could be spending this time enjoying one of your hobbies. With JMS to schedule and control your batch jobs, and with Callback to monitor your system looking for critical conditions, you can better enjoy your free time knowing that if a problem does occur, you will be notified by phone or pager.

## CALLBACK SYSTEM DOWN DETECTOR AND JOB NOTIFICATION SYSTEM

Voice notification for:

- System hangs
- Printer status
- Physical conditions
- User requests
- Job aborts
- Logon security
- Adverse temperature
- Reply pending
- Console messages
- Special job events
- Power loss
- Spoolfile scanning

## JMS JOB MANAGEMENT SYSTEM

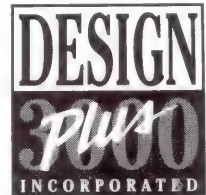
Automated control for the scheduling and execution of batch jobs with very flexible scheduling capabilities and dependencies. Easy to use, no command language to learn and no jcl changes. JMS is a multiple-CPU system that allows jobs to have dependencies across the network. Ad hoc streamed jobs may be incorporated to allow complete batch job control. **Leaders in tools for the "Lights Out Environment". Call us today for a free 30 day demo. MPE/XL or HP-UX.**

### Corporate Headquarters

3470 Pipebend Place, NE #120  
Salem, OR 97301  
Phone: (503) 585-0512  
FAX: (503) 585-1706

### International Sales Office

System Software Intl.  
Oakmoore Court  
Hampton Lovett  
Droitwich, Worcs.  
England WR9 0QH  
Phone: 44 905 79 4646  
FAX: 44 905 79 4505



CIRCLE 34 ON READER SERVICE CARD

# Ever want to get Lew Platt's attention? *We can.*



**interex**

*Shared Knowledge.  
Shared Power.*

**Nobody gets HP's attention like Interex – the International Association of Hewlett-Packard Computing Professionals.**

We make it happen through our size – over 7,500 strong-minded, well-organized members dedicated to representing the interests of HP customers and users worldwide. And we make it happen through our unique relationship with HP—one based on a mutual credibility and respect that's grown over the past two decades.

We've been able to influence HP on issues from product support to customer relations. And our members are responsible for hundreds of

upgrades and enhancements to HP hardware and software.

With Interex, you'll find another kind of strength in numbers...the number of people who are there to share ideas and offer solutions whenever you need them.

Add it all up, and you'll see why Interex has long been the industry's most effective voice for HP customers and users.

**Join Interex today, and tap into the power that comes from people banding together to get what they need.**

**The International Association of Hewlett-Packard Computing Professionals**

Promoting Information Exchange via:  
Contributed Software,  
Technical Publications,  
Advocacy Forums,  
Conferences, and  
Regional & Special Interest User Groups

**For membership information, call, fax, or e-mail Interex.**

**Tel:** 800. 468.3739 or 408.747.0227 **Fax:** 408.747.0947 **E-mail:** [membership@interex.org](mailto:membership@interex.org)

daemons that are part of a UNIX system. They divide the daemons into sections by function, so you can determine which ones you need to run, based on your configuration and requirements.

The last chapter in the book seemed out of place, considering the technical nature of the earlier sections. It is simply called Policy and Politics. The authors speak (write) their minds. This section presents several real-world situations that do not have a clear-cut right or wrong answer. Topics here address user and administrator policy agreements, legal issues, and tips on hiring and firing staff.

While most of the authors come from an academic environment and some of their suggestions are tailored to that environment, the issues they bring up made me think about what I would have done, if I were faced with the same situations. After reading the chapter, I was glad they included it.

Unlike many other books on this topic, the authors do not try to make System Administration seem easy or glamorous. After their introductions and overview of the book they launch into a section named System Administration under Duress.

In a few paragraphs they describe how 99 percent of administrators became administrators: You learned how to do something and soon everyone began relying on you to continue doing it. I know that's how I got started. Read section 1.6 for a very realistic look at our profession. The authors also include tips on how to get the recognition and hours necessary to perform this job, especially if administrator is not your primary responsibility.

Some general comments about the book: It is very easy to read. Lots of examples, specific comments about the

different versions of UNIX, cute drawings, and a couple of sarcastic comments about AIX, MS-DOS, and the Macintosh.

My favorite quote from the book is on page 70 in a discussion of how new UNIX processes are created: "New processes are created by other processes, just like new humans." In a footnote they add, "New humans are normally created by other humans, not by UNIX processes."

Since the book covered multiple versions of UNIX, I paid particular attention to the sections about HP-UX. First, the book uses HP-UX on the Series 700, so some of what they describe does not apply to the Series 800. Also some of the subjects discussed are different on the Series 800 than as described. Check the HP-UX documentation to see how to perform a function on a Series 800. The authors also make a great effort to define where HP-UX 9.0 received some of its functionality. Some is from BSD, some from ATT UNIX, and a lot is home-grown. While not necessary to manage an HP-UX system, it is nice to know.

The authors do make a couple of incorrect comments about HP-UX. First they had problems executing programs when the operating system was shut down. On page 40 they state that you cannot get scripts in `/etc/shutdown.d` to execute. Since they do not say which version of 9.0 they were running, I cannot say if this was a bug in an earlier version, but I know it works in 9.03 and 9.05.

They also take a swipe at HP's sendmail on page 458. They discovered one of the more annoying things about how HP wants you to perform system administration: SAM. They were unable to start HP's sendmail since it did not have the correct permissions and it could not find a `sendmail.cf` file. What they did not know is that SAM creates the `sendmail.cf` file

and changes the permissions on the sendmail executable when you use SAM to configure and enable sendmail.

The sendmail example caused me to reread sections of the book to see how they were enabling and configuring the UNIX subsystems. In every case they were editing the configuration files by hand. Nowhere was there mention of SAM or its cousins in Solaris, OSF, or SunOS. While I agree that knowing what functions these automated interfaces perform with a press of a button, skipping over them makes the administration task look a lot more daunting than it is.

I highly recommend this book to all levels of System Administrators—especially with all the tools that are provided on the CD-ROM. You won't be disappointed. ■

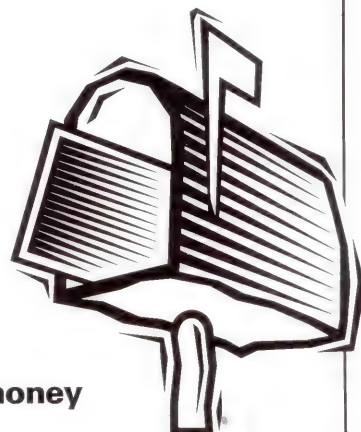
---

*Chris Curtin, a software developer for Bradley Ward Systems, Inc. in Atlanta, Georgia, specializes in device driver development for factory automation on the HP 9000. He can be reached via e-mail at: [chris@bwilab3.atl.ga.us](mailto:chris@bwilab3.atl.ga.us).*



# **Consider the advantages** of Interex's **Direct Mailing Services** in your future advertising campaigns

- 30,000 HEWLETT-PACKARD Computer Users
- One-week turnaround time
- Less than 2 percent returns because of bad addresses
- Full refund for all nixes (bad addresses)
- 15 percent discount on all orders over 10,000 labels
- List updated weekly



**We can offer you the greatest value for your money  
with our Direct Mailings.**

Do you have NEW PRODUCTS you want to announce to the HP community?

The HIGHEST RESPONSE RATES for your new developments are almost always with Direct Mailings.

We can mail your advertisement items from our designated mail house in California, or from a bonded mail house in your city.

Give us a call today; we'll get your important product message out to our more than 30,000 HP Computer Users, and YOUR REPLIES will start coming to you the following week.

---

**PLEASE SEND ME INFORMATION ABOUT YOUR DIRECT MAILING SERVICE!**

Name

Company

Address

City  State

Country  Zip/Postal Code

Phone  Fax

☐ HP 3000

☐ HP 1000

☐ HP 9000

☐ PC

**For more information, contact Nader Saghafi, 1.800.INTEREX,**  
Interex, P.O. Box 3439, Sunnyvale, CA 94088-3439 USA, Phone 408.747.0227, Fax 408.747.0947.

# Hardware Review

*by Wendy L. King*

## DAA Modem Control MUX Panel for the HP 1000 A&F Series

THE PACKAGE WAS SMALL, the contents plain, and I could not install it fast enough. Ignoring the instructions, I powered off the HP Modem Card Cage on my A990, switched the 12040D MUX interface cable to the new DAA Full Modem Control Multiplexer Panel, and powered it up. For 24 hours I did nothing else. The 20 automatic phone calls to remote systems were completed without a murmur. I heard silence from users who call into my systems. The system console displayed no errors. This was absolutely the most seamless change of hardware I had ever seen.

It was difficult to contain my glee as I verified that all my data acquisition over the dial-up modems worked just as though the old HP Modem Card Cage was still installed. Next, I opened the small, simple manual, skipped over the gen and init stuff, and read the programmatic status and control instructions. It is a bit techie, but in minutes I was able to use the CO command to raise or lower DTR, and retrieve the status of one or all the MUX ports. Another few minutes, and I had written a program that successfully controlled the ports and reported their status using plain English.

### **A Little History**

A900 users have been asking for a full modem control MUX panel for a very long time. It has been on every SIC RTE Ballot and would have been a top choice if improved LAN performance had not been a higher priority for most of us struggling to keep our HP 1000 systems "up to speed" in expanding LAN environments. Each year, shrinking HP resources have forced us to pick only one major enhancement.

The standard RS-232-C MUX panel

for the A900 does not support full modem control because it has only pins 2, 3, and 7 (transmit, receive, and ground). The single-port 12005B ASI is not a true full duplex card (no XonXoff), has no FIFO buffer, and does not support user control of DTR. Until now, only the HP37214A Modem Card Cage (also known as the South Queensferry box) supported multiple, full modem control serial ports on a single interface without requiring that users provide their own microcode or driver.

However, the Queensferry price is, to quote a long-time RTE user, "a \$10,000 solution to a \$200 problem." It requires individual cards for each port and is simply too much equipment occupying too much real estate and costing too many dollars for one or two modem control port requirements.

HP removed the HP37214A Modem Card Cage from the corporate price list a few years ago, with nothing to replace it. When I needed full modem control for multiple ports on another A900 last year, I contacted six vendors before I found a used one. With the end of support life in sight, even a used one is not a good solution.

The HP12792 8-Channel Asynchronous Multiplexer for the HP 1000 F Series does not provide full modem control, but because the BACCI is an adequate alternative, its users have not expressed a burning desire for a full modem control MUX panel. So it is something of a bonus for them that the DAA 12854A also works with the HP12792 MUX, now offering multiple ports with full modem control capability on a single interface. I do not have an F Series computer to test it, but since the documentation makes no distinction, I assume the control and status commands



work equally on both systems.

### The DAA 12854A MUX Panel

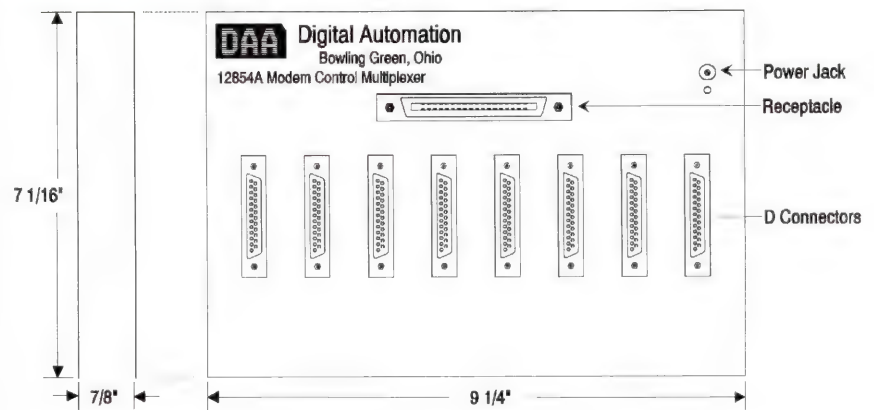
The 12854A multiplexer distribution panel, manufactured by Digital Automation Associates Incorporated, supersedes the discontinued A900 Series HP37214A Modem Card Cage, providing dialup modem support for the HP12040D and the F Series HP12792 8-channel Asynchronous Multiplexers. For dialup full duplex modem applications, the 12854A provides up to seven modem ports. Ports not required for modem control may be used for local terminal connections to the multiplexer, since the 12854A multiplexer can also function as an RS-232 8-channel multiplexer with no modem control.

The 12854A multiplexer distribution panel dimensions are  $7\frac{1}{16}$ " high  $\times$   $9\frac{1}{4}$ " wide  $\times$   $\frac{7}{8}$ " deep (you can hold it in the palm of your hand). It has eight 25-pin female D-connectors, one 36-pin receptacle connector, and a power jack. All of the connectors and jacks are accessed through the front panel. *Figure 1* shows a drawing of the panel.

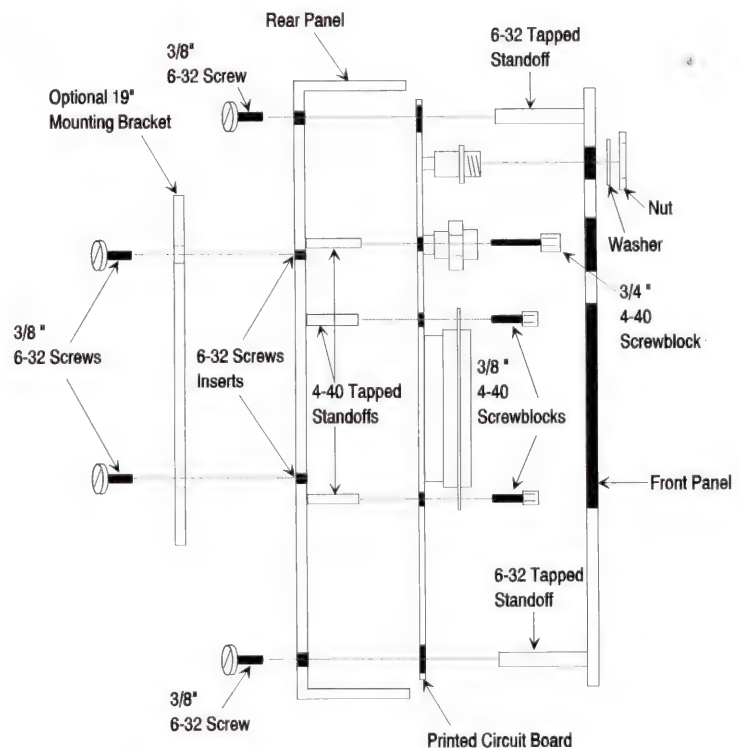
The 12854A assembly consists of front and rear steel panels and a printed circuit board. The 12854A distribution panel can be mounted on an optional 19-inch rack mount bracket. It mounts perfectly on the older rack mount bracket for the 36-pin HP12828A RS-232-C panel. It cannot be mounted on the rack mount bracket for the newer 50-pin HP28658-60005 RS-232-C panel because the screw holes do not line up. *Figure 2* shows a side view of the 12854A assembly with the optional 19-inch rack mount bracket.

An external power supply must be connected to the 12854A distribution panel. The power supply is a wall transformer

**FIGURE 1** 12854A Panel



**FIGURE 2** Side view of 12854A



that uses standard 110V AC 60 Hz input with an output of +5V DC (500 ma). The power plug of the wall transformer is connected to the power jack on the 12854A distribution panel.

If a Digital Automation 12828-60032 cable is purchased, the multiplexer is powered from the HP 1000. In this case,

no external power supply is needed. The 12854A multiplexer must be fused differently for this feature; fusing is done by the vendor before a unit is shipped.

A 36-pin receptacle is located on the front of the 12854A distribution panel. The connector provides an interface to the computer. *Figure 3* describes the pin

**FIGURE 3** 36-pin receptacle

Pin Number	Signal	Description
1	RD7+	Receive Data Common
2	SD7+	Send Data Common
3	RD6+	Receive Data Common
4	SD6+	Send Data Common
5	RD5+	Receive Data Common
6	SD5+	Send Data Common
7	RD4+	Receive Data Common
8	SD4+	Send Data Common
9	RD3+	Receive Data Common
10	SD3+	Send Data Common
11	RD2+	Receive Data Common
12	SD2+	Send Data Common
13	RD1+	Receive Data Common
14	SD1+	Send Data Common
15	RD0+	Receive Data Common
16	SD0+	Send Data Common
17	GND	Frame Ground
18	+5V	Optional Power from HP1000
19	RD7-	Receive Data
20	SD7-	Send Data
21	RD6-	Receive Data
22	SD6-	Send Data
23	RD5-	Receive Data
24	SD5-	Send Data
25	RD4-	Receive Data
26	SD4-	Send Data
27	RD3-	Receive Data
28	SD3-	Send Data
29	RD2-	Receive Data
30	SD2-	Send Data
31	RD1-	Receive Data
32	SD1-	Send Data
33	RD0-	Receive Data
34	SD0-	Send Data
35	-----	No Connection
36	-----	No Connection

**FIGURE 5** 1's AND 0's = Bits and Bytes: What They Mean

Byte 1 = 0000 = 0 = @ = no RI  
 0001 = 1 = A = RI (incoming call)

Byte 2 = 0000 = 0 = @ = no CTS or DSR or DCD  
 0010 = 2 = B = CTS  
 0100 = 4 = D = DSR  
 0110 = 6 = F = CTS DSR  
 1000 = 8 = H = DCD  
 1010 = 10 = J = DCD CTS  
 1100 = 12 = L = DCD DSR  
 1110 = 14 = N = CTS DSR DCD

Byte 5 = 0000 = 0 = @ = no DTR  
 = 0010 = 2 = B = DTR

assignment of the 36-pin receptacle. Users who replace a 50-pin HP panel with the DAA 12854A must purchase a new cable. I replaced a 36-pin HP panel using the cable I already had, and it worked fine. *Figure 4* presents the pin assignments of the 25-pin female D connector.

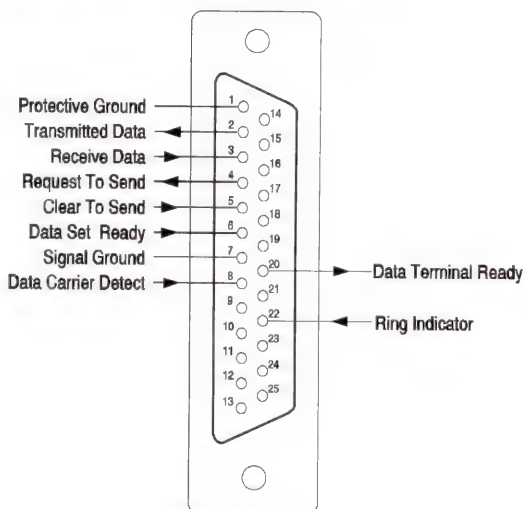
### Backward Compatibility

Digital Automation Associates have really taken care of the HP Modem Card Cage installed base. The DAA Modem Control MUX Panel "feels" just like the old HP Modem Card Cage, and has been so well done that neither the 12040D MUX interface nor the RTE-A system sees any difference. The manual is easy to follow. I wrote a simple program to control DTR or retrieve port status on the DAA MUX panel. With no modification, this program works equally well with my HP Modem Card Cage. *Listing 1* contains the program listing, and *Figure 5* translates the status returned by the controller port from techie 1's and 0's to plain English. I tested and now use the panel on an A990 (upgrade from an A900) running RTE-A Revision 6.1 with 12040D MUX Revision 5.22 firmware.

### Modem-Host Interaction

Incoming calls are handled by HPMDM, which is part of the RTE-A software product. It is scheduled by the driver to handle the mechanics of connection and disconnection with cleanup duties thrown in. The HPMDM interface with the DAA MUX Panel is flawlessly identical to that with the HP Modem Card Cage.

When a standard (Hayes-compatible) modem is being used for dialing out, the importance of the state of the host computer's DTR is relative to the significance the modem has been

**FIGURE 4** 25-pin female D Connector



# The Hewlett-Packard Computing Event of the Year!

**Metro Toronto Convention Centre  
Toronto, Ontario, Canada**

## **Interex '95** **Conference & Expo**

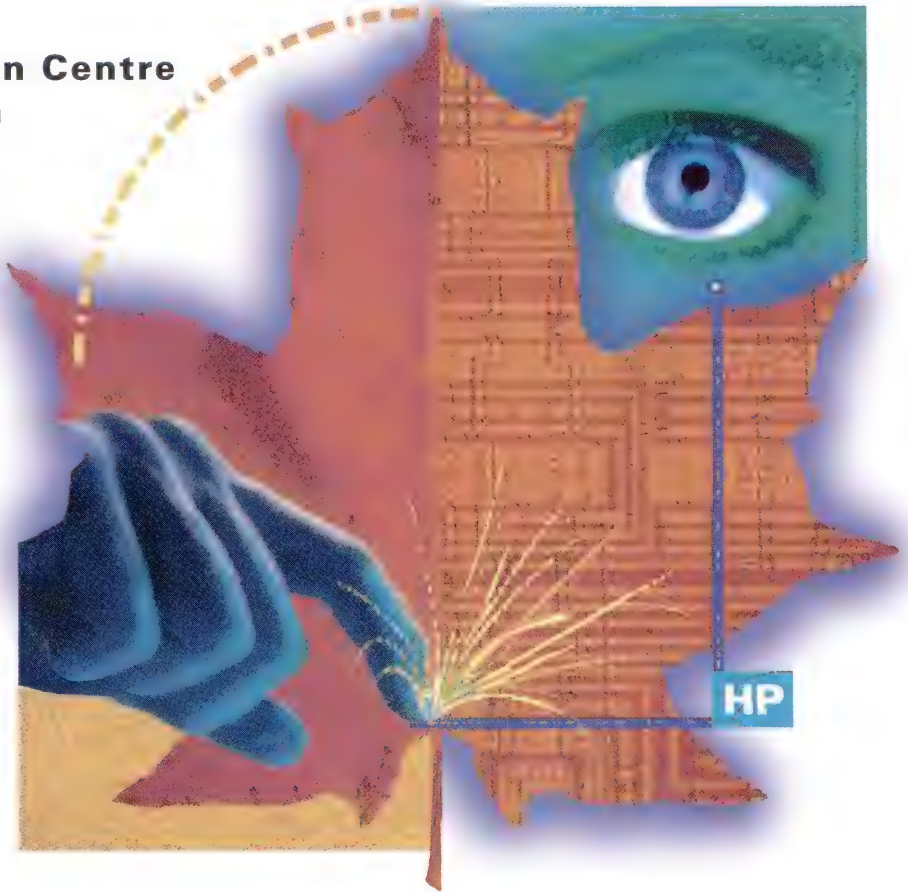
**14-18 AUGUST 1995**

### **New in 1995!**

In addition to Interex's solutions-oriented Conference & Expo focusing on "Building, Managing, and Using Key Technologies," Interex '95 will include a one-day Management Symposium (formerly Executive Interex).

Featuring Dr. James C. Wetherbe, the internationally known authority on the use of computers and information systems, the Symposium is designed to give you the information you need to strategically manage both technology and people in an increasingly complex global economy.

Also for the first time, Hewlett-Packard's 7th annual Manufacturing Productivity Users' Conference will run concurrently with the Interex Conference & Expo. This provides a unique opportunity for users to share experiences and meet HP professionals who are directly involved with developing and supporting MMII.



### **There's more!**

The program has been planned so that both Management Symposium and MMII attendees will also be able to attend the Interex '95 main conference sessions and events, as well as have access to the hundreds of exhibits at the Expo. To learn more about all of these extremely valuable events, call

**800.990.EXPO**



**interex**

*Shared Knowledge.  
Shared Power.*

**Endorsed by**  
 **HEWLETT  
PACKARD**

**LISTING 1** *DTR Status and Control Program*

```

ftn7x,l
  program DtrCntrl
  implicit none
  integer*2 :: CntrlrLu $parameter (CntrlrLu = 88) !customize for host
  integer*2 :: LastPort $parameter (LastPort = 6)
  integer*2 :: StdOut $parameter (StdOut = 1)
  integer*2 :: cntwd(2),i,j,PortNo
  integer*2 :: ibuf(4)
  character :: cbuf*8
  equivalence (cbuf,ibuf)
  character*1 byte1,byte2,byte3,byte4,byte5,byte6
  equivalence (cbuf(3:3),Byte1)
  equivalence (cbuf(4:4),Byte2)
  equivalence (cbuf(5:5),Byte3)
  equivalence (cbuf(6:6),Byte4)
  equivalence (cbuf(7:7),Byte5)
  equivalence (cbuf(8:8),Byte6)
  character*20 Byte1Status(0: 1)
  character*20 Byte2Status(0:14)
  character*20 Byte5Status(0: 2)

  data Byte1Status( 0) / 'RI' /
  data Byte1Status( 1) / 'RI' /
  data Byte2Status( 0) / 'CTS DSR DCD lo' /
  data Byte2Status( 2) / 'CTS' /
  data Byte2Status( 4) / 'DSR' /
  data Byte2Status( 6) / 'CTS DSR' /
  data Byte2Status( 8) / 'DCD' /
  data Byte2Status(10) / 'DCD CTS' /
  data Byte2Status(12) / 'DCD DSR' /
  data Byte2Status(14) / 'CTS DSR DCD hi' /
  data Byte5Status( 0) / 'DTR' /
  data Byte5Status( 2) / 'DTR' /

  *-----
  *** initialize the I/O control word for exec calls with the
  *** mux panel controller port 7 LU number.
      cntwd(1) = CntrlrLu
      cntwd(2) = 0
  *** request and display abbreviated single byte status of all ports
      call charfill(cbuf,' ')
      write(cbuf,'(2(a))'?'',char(13))
      call xluex(2,cntwd,ibuf,-2)
      call charfill(cbuf,' ')
      call xluex(1,cntwd,ibuf,-7)
      write(StdOut,'(/x,a,a)')'Mux Status = ',cbuf(1:7)

  do i = 1,7
    j = i - 1
    if(cbuf(i:i).eq.'Z') then
      write(StdOut,*)'Port ',j,' Power-up reset'
    elseif(cbuf(i:i).eq.'N') then

```

Continued on Page 50



## Attention HP Channel Partners

If your company's strategic plan includes tapping into HP's expanding market share, you should seriously consider exhibiting at **Interex '95** — the world's largest exhibit of Hewlett-Packard compatible products and services.

As a Channel Partner enrolled in HP's IMpact Program, you are now eligible to claim up to 100 percent of the cost of exhibiting at Interex conferences from your co-op account (if all IMpact guidelines are met). If you are not enrolled in the IMpact Program and would like to know more about it, please contact your HP Channel Representative or IMpact Consultant at 408.447.5555 for more details.

**interex**

*The International  
Association of  
Hewlett-Packard  
Computing Professionals*

**OUR 15th YEAR**

## QUALITY HP WORKSTATIONS - WITHOUT THE HP PRICE

### RENT · LEASE · BUY

Immediate Delivery On Most Items

- 700 SERIES: Models 710, 715/50, 715/75, 735, 735/125, 712/60, 712/80, 745i
- X-STATIONS: ENVIZEX, C270X
- All 300, 400T and 400E Series
- Memory, Features & Disc Upgrades for all Workstations
- CPU Upgrades: 715/50, 715/75, 735, 735/125, 425, 380, 360

*More Than 1500 Satisfied Customers  
Throughout The USA and Worldwide*

For technical info, specs or pricing  
call Mordy or Carol



**C.S.U. Industries, Inc.**

207 Rockaway Turnpike, Lawrence, NY 11559  
(516) 239-4310 FAX (516) 239-8374

**LISTING 1** *DTR Status and Control Program, continued*

```

        write(StdOut,*)'Port ',j,' Unavailable: DSR,DCD lo'
    elseif(cbuf(i:i).eq.'B') then
        write(StdOut,*)'Port ',j,' Being Called: RI hi'
    elseif(cbuf(i:i).eq.'H') then
        write(StdOut,*)'Port ',j,' Connect:      DTR,DSR,DCD hi'
    elseif(cbuf(i:i).eq.'D') then
        write(StdOut,*)'Port ',j,' Disconnected: DSR,DCD hi; DTR lo'
    endif
enddo

*** Raise DTR on each port, request and display status
write(StdOut,'(/a/)')' Raising DTR on all ports...'

DO PortNo = 0,LastPort
    call charfill(cbuf,' ')
    write(cbuf,'(i1,2(a))')PortNo,'E',char(13)
    call xluex(2,cntwd,ibuf,-3)    ! send command to controller
    call exec(12,0,2,0,-2)        ! allow time for response
    call charfill(cbuf,' ')
    write(cbuf,'(i1,2(a))')PortNo,'Q',char(13)
    call xluex(2,cntwd,ibuf,-3)    ! ask for status
    call charfill(cbuf,' ')
    call xluex(1,cntwd,ibuf,-8)
    write(StdOut,'(a,i1,a)')' Port ',PortNo,': _'
    write(StdOut,*)cbuf
    write(StdOut,'(9x,a)')Byte5Status(iand(15,ichar(byte5)))
    write(StdOut,'(9x,a)')Byte2Status(iand(15,ichar(byte2)))
    write(StdOut,'(9x,a)')Byte1Status(iand(15,ichar(byte1)))
ENDDO

* *** Lower DTR on each port and report the status

write(StdOut,'(/a/)')' Lowering DTR on all ports...'

DO PortNo = 0,LastPort
    call charfill(cbuf,' ')
    write(cbuf,'(i1,2(a))')PortNo,'Y',char(13)
    call xluex(2,cntwd,ibuf,-3)    ! send command to controller
    call exec(12,0,2,0,-2)        ! allow time for response
    call charfill(cbuf,' ')
    write(cbuf,'(i1,2(a))')PortNo,'Q',char(13)
    call xluex(2,cntwd,ibuf,-3)    ! ask for status
    call charfill(cbuf,' ')
    call xluex(1,cntwd,ibuf,-8)
    write(StdOut,'(a,i1,a)')' Port ',PortNo,': _'
    write(StdOut,*)cbuf
    write(StdOut,'(9x,a)')Byte5Status(iand(15,ichar(byte5)))
    write(StdOut,'(9x,a)')Byte2Status(iand(15,ichar(byte2)))
    write(StdOut,'(9x,a)')Byte1Status(iand(15,ichar(byte1)))
ENDDO

end

```



told to give it. Most Hayes-compatible modems can be set up to do one of the following:

1. Ignore DTR—Connect incoming calls and respond to host commands regardless of whether DTR is high or low, and do not disconnect in the event of a DTR transition.
2. DTR Controls Only Disconnects—Connect incoming calls regardless of DTR state, but disconnect on transition from high to low.
3. DTR Controls—Connect incoming calls and respond to host commands only if DTR is high, and disconnect on transition from high to low.

It is possible for the A900 to be so busy that it misses the ring indicator for one or more rings. If the modem is set up for DTR to be ignored, or to control only disconnects, then the modem will establish a connection to the calling modem as soon as the prescribed number of rings has been received. If that number is one, then the modem may establish the connection before the MUX driver has "seen" the ring and scheduled HPMDM. In this case the caller gets the message that the modems are connected, but no login prompt. This can also occur if DTR is raised when a call comes in.

For incoming calls to work correctly, the modem must be told that DTR controls everything as described in number 3, and DTR must be low. To successfully dialout through the same modem requires that DTR must be raised. This means that to use the same modem to dialout, you *must* be able to RAISE DTR so that the modem will

receive and respond to your configuration and/or dialout commands.

*The RTE-A Driver Reference Manual* describes the CN/Exec command sequences to control DTR in terms of connection and disconnection states and the resulting status of the line down bit in word six of the DVT. After a disconnection sequence that leaves DTR low, a successful write request requires the use of the special 37B function code, which raises DTR so that the modem set to pay attention to DTR will accept commands and respond. To activate connection with your modem, you either set the port timeout to 0, turn off modem control, and then turn it on again using the CN 30B and CN 31B commands, or you write a program to issue the commands with exec calls so you can implement the special 37B function code I just mentioned. Either way, this is a painful way to "talk" to your modem when its port is con-

sidered "disconnected."

An easier way to control DTR and get the status of one or all the ports is to issue commands to the controller port. This is documented in Chapter 3 of the *HP37213A/4A/4A/6A Systems Modem Installation and Reference Manual* and the Installation Section of the DAA 12854A manual. The DAA MUX panel control commands are identical to those for the HP Modem Card Cage, which may be why, except for the C and D (Connect and Disconnect) commands, they are not remotely intuitive.

The control commands supported by the 12854A panel are:

E, C, or V—raise (turn on) DTR (Pin 20) and RTS (Pin4)

Y, D, or W—lower (turn off) DTR (Pin 20) and RTS (Pin4)

The HP Modem Card Cage supports HP37213A Modem cards,

• Dedicated Disaster Recovery • Trained Experts • Planning Support •

## Will a Computer Disaster Leave You Hanging?

What will an outage of a day, week, or even a month cost your business?

Specializing in hot site support for mid-range computers, DAC provides state-of-the-art disaster recovery for:

- HP9000 • HP3000
- IBM RS/6000
- Digital Alpha/AXP
- Sun Microsystems
- Sequent Computers
- Data General AV & MV
- Unisys U6000
- PC Servers



### DAC provides:

**Rapid Recovery** — No waiting for replacement equipment.

**Planning Support** — A guide to make planning easy.

**Thorough Subscriber Testing** — Resolves all obstacles.

**Affordable Fees** — A redundant system at a fraction of the actual cost.

**Call (800) 654-1689 Today to Protect Your Business**

**Data Assurance Corporation**

"Computers, Communications and People Dedicated to Disaster Recovery"  
12503 E. Euclid Drive, Suite 250 • Englewood, Colorado 80111

• Affordable Fees • Extensive Communications • No Notification Fees •

Industry Leader • State-of-the-art Resources •

Thorough Subscriber Testing • No Usage Fees •

CIRCLE 51 ON READER SERVICE CARD

**FIGURE 6** *Controller Port Initialization Commands*

```
* File: /CMDFILES/LU88DAA.CFG:::4:1:34
* DAA 12854A link with mux operates via channel 7 at 1200 bps
* using 8-bit framing, no parity, and one stop bit.
* Channel 7 is lu 88. These commands set channel 7, lu 88 to
* 1200/8/1/NoPar;fifo enabled;cpu protocol;prompt disabled;T0 5 mins
* The Gen Record for default driver parameters is:
*     dvt,/rte_a/ddc01.rel,MQTD_PORT7,lu:88
* If this entry is in the gen, this configuration file does not
* need to be executed at boot-up, but can be used to reset the
* port if needed. Channel 7, lu 88, is on BRG 0, by itself.
* All other channels are on BRG 1.
*-----
cn 88 35b 0
cn 88 16b 10b
cn 88 30b 77b
cn 88 21b
cn 88 41b
cn 88 33b 100000b
cn 88 34b 4
cn 88 22b 30000
```

HP37215A External Modem cards, and terminal cards.  
When used with the HP Modem card:

- E—Configures the modem to auto answer
- C—Connects the modem to line except when configured for local analog loop
- V—Initiates a remote digital loop configuration
- Y—Disables the modem from auto answer
- D—Disconnects the modem from the line
- W—Disables either a local analog loop or a remote digital loop

The DAA panel documentation does not indicate that any control other than the specified DTR and RTS toggles are supported.

If you haven't written or acquired a program to do it, you can control DTR interactively using the CO command to send the commands to the controller port 7. For example, to raise DTR on port 5, whose controller port lu is 87:

```
A1> co 1 87
Copying 1 to 87
5c
[ok] (input terminated with cntl D)
A1>
```

You can also put the command(s) in a file and simply copy the file to the controller port.

While testing the controller port commands with my HP Modem Card Cage and the DAA MUX panel, I discovered that the "line down bit" set on completion of a disconnection sequence actually has nothing to do with the driver's refusal to accept I/O requests to a "disconnected" port. If I raise DTR on a "disconnected" port by sending a command to the HP Modem Card Cage or the DAA MUX controller port, the "line down bit" is unaffected. If it was set to begin with, it remains set, but once DTR has been raised, read and write requests finish normally without the special 37B function code.

So it seems to be the state of DTR that determines acceptance and completion of I/O requests, not the DVT6 line down bit.

### Controlling Other Serial Devices

HPMDM takes good care of incoming calls. However, several other common serial connections are not served by the HPMDM program but do require host/user control of DTR. For example:

- a modem that requires an active DTR to respond to host commands
- a serial link with a line driver that derives its power from pin 20
- any serial device that will not "talk" unless DTR is present
- a serial or DTC connection that will not disconnect unless a raised DTR is lowered

Each of these requirements exists on my RTE-A systems, and I have now moved each one to the DAA panel with no trouble. In each case, the existing applications continued to run without error. As with the dialout calls, it was a seamless, transparent hardware change.

### RTE-A Installation

For full modem control support, use the "01" versions of the interface and the device drivers ID801.REL and



# InterWorks '95



## Phoenix

International HP Workstation Users Group Conference  
Phoenix, Arizona — May 7–10, 1995

This conference promises to be the most extensive technical conference for HP workstation system users. It's your opportunity to learn what's new in HP workstation hardware, software, and state-of-the-art technology. Also, it's your chance to share and learn from the knowledge within the InterWorks user community.

So, if you work primarily with HP 9000 workstations, come reap the benefits of InterWorks '95.

**Conference Highlights:**

- Pre- and Post-Conference Educational Training Seminars
- Tutorials presented by HP engineering teams and professionals in the user community

- Keynote presentations by Bernard Guidon, General Manager, and Karl Freund, Marketing Manager, of HP's Workstation Systems Division and Steve Legensky, Founder and Principal of Intelligent Light
- Technical Lab, which contains HP workstation products for hands-on, practical applications, and discussions with HP technical engineering specialists
- Vendor arcade, featuring the latest applications on HP workstations

For further information on the conference and membership, call Cyndi Charest at 508/436-4460 or email [charest@apollo.hp.com](mailto:charest@apollo.hp.com)

## Topics Coming in the July/August Issue of

# hp-ux/usr



A Network Break-in

Getting the Most  
out of HP-UX

HP-UX 10.0 Cookbook



## interex

Shared Knowledge.  
Shared Power.

DDC01.REL. I have tried using HPMDM on a port that was genmed with ID800 and/or DDC00, and it did not work. For the A-Series, the commands required to install and initialize this device are relatively simple.

### Controller Port

There is a Gen Record, documented in the *Generation and Installation Manual* in the "Default DVT Entries By Driver Name," Appendix F, under the DDC00 driver, which can be used to give you the correct configuration for the controller port 7 at bootup. The Gen Record is:

```
dvt,/rte_a/ddc01.rel,MQTD_PORT7,LU:<your controller lu #>
```

If this is included in your answer file, no other boot-up initialization commands are required in your welcome file for the controller port 7. If you run SPORT on the controller lu after boot-up and before any commands have been sent to the port, it will say that the port does not respond to a dynamic status request and may not be initialized. However, after the first command has been completed, a subsequent SPORT will produce the usual port configuration display. For example:

```
A1> sport 87
Status for LU 87:                      950105.170339
Device Driver:      DDC01 Rev. 6100      Driver type = 00
Interface Driver:   ID801 Rev. 6000
Firmware:                      Rev. 5.22
CN20: Primary Program:          HPMDM (Disabled)
CN40: Secondary Program:        HPMDM (Disabled)
CN17: 000000B No user defined terminators
CN22: 30000 Timeout = 300.00 seconds
CN16: 000010B BRG0 range 8 (300 600 1200)
CN30: 000077B Frame=8/1 None BRG0 1200 baud Port 7
CN31: 000000B
CN33: 100000B FIFO buffering 0 chars in fifo
CN34: 000004B CPU Protocol
DV20: 000077B Character mode
DVT Address: 56635B; IFT Address: 62042B
```

A1>

If you want to replace your existing MUX panel with the full modem control panel without re-genning your system, you can initialize the controller port online. The commands to duplicate the required initialization can be put in a command (script) file, which can be used at boot-up or to reset the port "on-the-fly" if necessary. Figure 6 contains a listing of these commands.

### Modem Ports

Modem LUs should be configured as non-HP terminals. The following gen answer file entry will default the modem lu to tty protocol:

```
dvt,/rte_a/ddc01.rel,MTERM:5,LU:85
```

This entry will also default the time out to five minutes, enable PROMT as the primary scheduled program, and HPMDM as the secondary scheduled program. FIFO buffering, modem control, and a user-defined terminating character will not be set. The default data framing is 8 bits, with no parity and one stop bit. Unless initialized to a specific baud rate, the port will speed sense.

For insurance, and to have a currently accurate port configuration file available for emergency resets, the ports can also be initialized from the welcome file at boot-up. The following example sets up my dialin modem port.



\*  
 \* lu 86 - 8/1/none/9600,xon/xoff,fifo,  
 disable prompt  
 \* lu 86 is on the D-MUX DAA modem  
 control MUX panel  
 \* lu 86 is on BRG 1; this config if for  
 the dialin modem  
 \*  
 cn 86 30b 136B  
 cn 86 21b  
 cn 86 22b 30000  
 cn 86 33b 0  
 cn 86 34b 1

Note that the modem control command is not included at this point, because HPMDM does that automatically for any port put under its control. If the port will be used only for dialing out, the modem control command is not required, since it will not be answering calls.

Dialin ports also must be put under HPMDM control so that PROMT will be scheduled. In the following commands, the first one adds the lu to HPMDM control, and the second tells HPMDM how to configure the port when an incoming call is connected. Since I do not want to risk the HPMDM default configuration being applied to my ports, I specify what I want for each one. In this case, the command specifies a speed of 9600, Xon/Xoff handshake protocol, and a 300-second timeout:

```
ru hpm dm 86 ad
ru hpm dm 86 BA=9600 HA=X0
TI=300
```

Using a port controlled by HPMDM to originate outgoing calls works fine, as long as you raise DTR before sending your commands. HPMDM does not interfere with this use of the port, so it

# DISK\_PAK FOR UNIX



Fragmented disks before DISK\_PAK

Optimized disks after DISK\_PAK

## Defragment your disks!

The first disk and file defragmenter to optimize performance for commercial UNIX operating systems. Available on DG/UX, SunOS, Solaris, AIX, SCO/UNIX, CLIX, and HP/UX.

- Defragments disks in-place.
- Visually displays disk organization.
- Improves disk performance.
- X Windows or character terminals.

**Call for your FREE Disk  
Fragmentation Analysis Kit!**



**EAGLE Software, Inc.**  
 123 Indiana Ave./ P.O. Box 16  
 Salina, KS 67402-0016  
 Phone: (913) 823-7257  
 FAX: (913) 823-6185  
 SALES HOTLINE: 800-477-5432  
 email: info@eaglesoft.com

All products listed are trademarks of their respective companies.

**CIRCLE 31 ON READER SERVICE CARD**

is not necessary first to remove it from that control.

### Documentation and Price

The biggest problem with modem setup and usage on the HP 1000 A-Series has been inadequate documentation. The simple manual that comes with the DAA Model 12854A Modem Control Multiplexer Panel makes it very easy to install and to configure the ports. I found the instructions for using the control commands to be simple, direct, and easy to follow. Although some of the wording comes directly from the *HP Modem Card Cage Manual*, it has been extracted carefully, appropriately, and effectively. I found the DAA MUX Panel to be an excellent product.

The DAA Series 12854A Modem Control Multiplexer Panel lists for \$2,950.50. DAA also sells Cable Kits, Rack Mount Brackets, RS-232 6-50 ft Modem Cables, RS-232 25-75 ft

Extension Cables, 10 ft Interface Cables, and Custom Length Computer-to-MUX Panel cables up to 50 ft with no external power supply.

The RS-232 Modem Control Multiplexer Panel, Model 12854A, is available from Digital Automation Associates, Inc., 310 W. Gypsy Lane Road, Bowling Green, OH 43402. Telephone: (419) 352-6977. ■

*Wendy King, a computer specialist at the U.S. Naval Observatory, has been managing HP 1000 systems and applications for 11 years. She can be reached at wendy@newton.usno.navy.mil.*



# HP-UX Systems Administration

by Chris Curtin

## Why I Hate PCs

...OR THE TRIALS AND TRIBULATIONS of installing a PC network. Last Christmas I undertook what I thought would be a simple task: network two 486 PCs running Windows For Workgroups 3.11 to my HP 900/E55 server running HP-UX 9.04.

My first step was to define my requirements: I needed to share the network printers from my E55, I needed to transfer files between the PCs and the E55, and I needed to be able to back up the PCs from the E55.

The backup scheme I use is to mount all the disk drives available on the network to the E55, then use *find* and *cpio* to back up any files that have changed since the last full backup. Not the most elegant system, but it works.

The first approach I took in installing was to use the network drivers that came with my laser printers. I have a LaserJet 4si and a LaserJet 4, each with a JetDirect card and drivers for MS Windows. When I download the updated drivers from the HP BBS and install them, I immediately crash Windows. OK, I call HP support. HP support informs me that I cannot load the JetDirect drivers into upper memory because of the way they wrote the drivers. I toss the drivers.

Next I install Lan Manager from HP. The literature from my sales representative looks like it will do what I want, so I start to install it. First problem. Lan Manager requires a newer version of the STREAMS files than what I have. I get the newer version from HP and continue the install.

Now that the filesets are loaded, I start to follow the installation steps in the manuals. Guess what? The manuals are for either a Windows server or an OS/2 server. To install an HP server, you must use the command line versions. Of course, nothing in the documentation says this.

So I follow the steps in the manual, looking up each function in the command line reference manual and typing it by hand. In several places I cannot find command line equivalents of the install commands! Calls to the Response Center are answered quickly and correctly, but this does not make up for the poor documentation!

I finally get the server side of Lan Manager installed and install the client side on one of the PCs. Installation is smooth, but when I try to log in to the server, I always get an authentication failure. Again the Response Center helps, but we never do get the problem figured out.

Even without the authentication I can mount the server's disks on the PC and use its printers. Next step: Mount the PC's disk to the server. No way, says the Response Center. The only way to back up the PC's disks to the server is to use the DOS backup command to copy the PC's disk to a server disk mounted to the PC. This is how we used to do it using HP's ARPA Services on our 286 PCs. We bought new hardware so we would not have to do this anymore. This requires an explicit operation on the PC and wastes disk space on the server. So I give up on Lan Manager.

Next phase of the journey involves using SunSoft's PC-NFS product. I call the SunSoft 800 number, describe exactly what I need, with emphasis on mounting the PC's disk to the E55, and am told that PC-NFS is what I need.

So FedEx arrives the next morning and I install PC-NFS. Right off the bat, I have to hand edit my *config.sys* and *autoexec.bat* files because the install script does not correctly install my LAN card. With this done I fire up Windows. On my first try I cannot see the printers on



# Optimizing your HP-UNIX system *today* has a lot to do with predicting how it will work *tomorrow.*

☞ If managing your HP systems seems to involve a lot of guesswork, then involve yourself in the answer — join Interex. As the International Association of Hewlett-Packard Computer Professionals, our collective voice has been actively involved in affecting the future of HP products for over 20 years. And by empowering our members to contribute their ideas to HP product development, it has taken a lot of the guesswork out of predicting the future of their systems.

## Protect Your Investment *now.*

☞ In addition to giving our members an opportunity to protect their investment in HP systems, Interex membership offers a number of opportunities to exchange ideas and information with other HP computer users. Any one of which makes Interex membership one of the best investments you can make in your career.

☞ Find out more by calling us at 1.800.INTEREX, e-mailing us at [membership@interex.org](mailto:membership@interex.org), or faxing us at 408.747.0947.



*Shared Knowledge.  
Shared Power.*

the E55. PC-NFS does not include any documentation on the server side of the connection, so I look through my HP manuals. I find the *pcnfsd(1M)* man page and perform the configuration as required.

*pcnfsd* accepts requests from PCs that use the NFS protocol for printing and mounting remote disks. In this file you define the printers available to the clients (PCs) and a list of user IDs that can use these printers and mount the server's exported disks. Its configuration file is in */etc/pcnfsd.conf*.

The first entry I place in the configuration file is 'wtm off'. This indicates that I do not want records of the PC logins. The second entry defines the user IDs that can log in to the server. According to the man page, *pcnfsd* will accept requests for any non-system account. However, this proves not to be the case, and the Response Center suggests that I define all the valid user IDs. I add the following to my configuration file:

```
uidrange 0-655376
```

The last item to configure for *pcnfsd* is the name of the printers accessible from the PC and the HP-UX command line to access the printer. Since the format of data sent by the PC does not match what the HP-UX *lp* spooler is expecting, you must tell the spooler not to try to interpret the data being printed. This is done with the *-oraw* option to *lp*. For example, the following line added to my *pcnfsd.conf* file allows the PCs to use the LaserJet 4si:

```
printer hp4si hplaser4si lp -oraw -dhplaser4si -onb
```

The 'printer' keyword defines the entry as a remote printer. The 'hp4si' field is the name of the printer from the PC's point of view. The 'hplaser4si' is the name of the printer as configured in the HP *lp* spooler and the rest of the line is the command called when the PC sends a print request.

With the configuration file changed, I kill *pcnfsd* and restart it. On the PC I immediately see the remote printers. So far, so good. I send a print request from the PC to the E55 and everything works great.

Next I start working on mounting the disks. Every time I try to mount a disk from the server, Windows locks up. After four days of working with SunSoft support, the people there determine that I cannot free enough memory in the 640K DOS area for Windows to work correctly. So I send it back. At least I know that the *pcnfsd* side worked.

It is now mid-January. So much for my Christmas project.... I still have to get the PCs on the network so my users can use them. I'm two weeks late in getting them online and people are getting annoyed. Next step, start calling everyone in the trade magazines who advertises a TCP/IP or NFS stack. In every case the vendors insist they can solve my problems, except for mounting the PCs to the E55. All of their solutions involve either copying the PC disks to a second disk, or not using the PC disk and installing all the PC applications on the E55's disk and mounting it at each PC.

Finally, I call NetManage and ask about their ChameleonNFS product. Their literature says they have both client and server NFS daemons in their product. Also that their product is a 100 percent Windows DLL and uses the *pcnfsd* configuration I have already completed.

The next morning the FedEx guy drops off two copies of ChameleonNFS and I prepare to install them. Installing the Lan Manager and PC-NFS packages has trashed my Windows .INI files and my *autoexec.bat* and *config.sys* files. I build each one by hand, using the Microsoft documentation to make sure I include everything.

Next I install the first ChameleonNFS system. After everything installs and I answer a couple of questions from their configuration programs, I can see my *pcnfsd* printers and my E-55 disks. Next I telnet to the E55 and can mount the PC's disk! I fool around with the ChameleonNFS side for another hour or so getting everything installed correctly, then install the second copy.

Problem solved, right? Not quite. Since the TCP/IP stack is a Windows DLL, if my users switch to DOS or start a DOS window, I lose my communications. There is no network printing from DOS or disk mounting. Also most of the time when my users enter DOS, they must reboot to get the NFS server to start correctly. Since my users spend most of their time in Windows, this is not an issue now and NetManage says they are working on it.

Also ChameleonNFS does not work nicely with Windows For Workgroups. To get both to work requires reconfiguring some of the networking setup in Windows and I am not comfortable with my users doing that. Thus I cannot run Windows For Workgroups networking. I still use the other features, though.

In conclusion I spent a lot of time on what should have been a simple and straightforward task. The frustrating thing was that the vendors of the PC networking software have not caught on to the type of installation I wanted to perform.



# Terabytes of CD-ROM Data Online



CONCORDE  
TECHNOLOGIES



HEWLETT  
PACKARD

Channel  
Partner

CD-ROM Networking Software

CD-ROM Jukebox Libraries

CD-ROM Towers and Drives

CD-ROM Network Servers

CD-ROM Recording System

Presenting the complete networking solution that inexpensively provides massive quantities of CD-ROM data transparently to UNIX, NFS, NetWare, LAN Manger and AppleShare clients.

For more information, call  
**Concorde Technologies, Inc.**  
at **(800) 359-0282.**



HP 9000 Systems • Application Software • RAM Memory • Mass Storage Peripherals • Accessories

CIRCLE 55 ON READER SERVICE CARD

What I really want to see is an NFS to Windows For Workgroups bridge that is seamless from the user's and administrator's point of view. Not *either* NFS *or* Windows For Workgroups networking. I want both.

Sorry that most of this column had to do with PC problems. As client-server computing becomes more mainstream, you may find yourself in the same situation. I hope by then your choices will be better.

## Support and Recovery Tapes (Part II)

After my November 1994 and January 1995 columns, I received a lot of e-mail from users and HP about using the Support and Recovery tapes. Several readers pointed out that relying on these tapes as an absolute recovery mechanism is dangerous. I agree. These utilities should be part of your recovery scheme, not the whole thing!

I have a challenge for other administrators: If you are in the pharmaceutical, telecommunications, or another industry where absolute recovery is necessary (i.e., you must be able to restore an exact copy of the system before the crash, not upgrade or just reinstall HP-UX), I would like to work with you to write an article or series of articles about how you go about doing this. Drop me an e-mail and I'll put you in touch with the right people at Interex.

I also received some e-mail from HP training people about a class HP offers—PN: H5368S: HP-UX Troubleshooting. It covers the support tape, the recovery tape, and other advanced administration topics. I have not taken the class, so I cannot comment on its contents.

Challenge number 2: Since I was unable to completely cover the Support tape/CD-ROM functionality in an earlier column, I would like to have some-

one at HP describe the functions available and how to use them. Again, drop me an e-mail and I'll either work with you on the article or put you in touch with the right people at Interex.

Please keep the e-mail comments and column suggestions coming. ■

*Chris Curtin, a software developer for Bradley Ward Systems, Inc. in Atlanta, Georgia, specializes in device driver development for factory automation on the HP 9000. He can be reached via e-mail at: [chris@bwilab3.atl.ga.us](mailto:chris@bwilab3.atl.ga.us).*

## Interesting Shell Question

WHILE ATTENDING THE JANUARY MARUG meeting in Charlotte, North Carolina, I was asked a question about the shell. The person wanted to write a shell that was serially reading a file with a 'while' loop. While reading that file, he wanted to prompt the user for additional information and instructions. This poses a problem. The standard input for statements within the 'while' loop will default to the standard input the 'while' statement itself is using. Therefore, the read associated with any prompt will read an additional line from the file and not the keyboard (as desired). To clarify the description, let's create an example.

For our example, let's say we are expecting strings of data to work on, but we want to give the user the chance to discard records that are exclusively numeric. Here is the contents of our data file, ostensibly named *input\_file*:

```
this is a test
of the emergency
1234567890
broadcast
system
```

We want our shell to read the first line and process it, then progress to the second line. The third line is numeric, so we will ask the user if it is appropriate to process the line. Then the fourth line should be processed and then the fifth and last line.

Here is the shell script:

```
while FILE_INPUT='line'
do
    echo "FILE INPUT WAS: ${FILE_INPUT}"
    if expr "${FILE_INPUT}" : "[0-9]" > /dev/null
    then
        echo "Encountered the following numeric input"
        echo "[${FILE_INPUT} ]"
        echo "Continue processing? (Y/N) \c"
        KEYBOARD_INPUT='line'
        case "${KEYBOARD_INPUT}" in
            [Yy]|[Yy][Ee][Ss] )
                echo "OK, the record will be processed."
                ;;
            [Nn]|[Nn][Oo] )
                echo "The record will NOT be processed."
                ;;
            * )
                echo "Your input [${KEYBOARD_INPUT}] \c"
                echo "was not understood."
                echo "The record will NOT be processed."
                ;;
        esac
    fi
done
```



```

        esac
    fi
done < input_file

```

Note that the 'while' loop takes standard input from our data file (*input\_file*). This is what we see when we run the script:

```

FILE INPUT WAS: this is a test
FILE INPUT WAS: of the emergency
FILE INPUT WAS: 1234567890
Encountered the following numeric input
[1234567890 ]
Continue processing? (Y/N) Your input [broadcast] was not understood.
The record will NOT be processed.
FILE INPUT WAS: system

```

This is not exactly what we wanted to see occur. When the script prompted the user to decide if the numeric input should be processed, the script read from the input file and not the keyboard.

The solution is to map the input from the read inside the 'while' loop to the keyboard while not interrupting the 'while' loop reading its input from the file.

One way to accomplish this is to read from standard error. Remember that standard out and standard error are both references to the terminal screen (until you change them). Standard output is file descriptor 1. Standard error is file descriptor 2. Standard input is the keyboard and is mapped to file descriptor 1. Guess what, you can also read from file descriptor 2, which is also mapped to the keyboard. Therefore, we can tell the read inside the 'while' loop to read specifically from standard error input like this:

```
KEYBOARD_INPUT='line <&2'
```

Now the shell run looks like we would expect:

```

FILE INPUT WAS: this is a test
FILE INPUT WAS: of the emergency
FILE INPUT WAS: 1234567890
Encountered the following numeric input
[1234567890 ]
Continue processing? (Y/N) n
The record will NOT be processed.
FILE INPUT WAS: broadcast
FILE INPUT WAS: system

```

In the spirit of UNIX (if you think about a task long enough, you should be able to come up with at least three ways of accomplishing it), here is a second method:

You can use the *exec* call to duplicate file descriptors. These file descriptors can be integers up to nine. I usually start at nine and go down. What I did was add the following line to the top of the script:

```
exec 9<&1
```

This creates a new file descriptor 9, which is a duplicate of file descriptor 1. File descriptor 1 is our keyboard input, which is what we want. The read within the 'while' loop then becomes:

```
KEYBOARD_INPUT='line <&9'
```

The resulting run of the shell script properly prompts the user when the numeric data is encountered.

Both methods are equally valid. I would not say that it is convention to read from standard error, though. I would also have to say that I do not frequently encounter shell scripts that use *exec* to re-map file descriptors. Also, the ability to use *exec* to manipulate file descriptors is not generally taught in shell scripting classes and is not widely known (until now?). Use whichever convention you like. Or, you can work on that third method out there somewhere. ■

---

*David L. Totsch has worked in several different organizations over the past seven years as a system administrator with various flavors of UNIX. At present he is working with HP-UX systems and wide area networks for a Fortune 100 company in the Piedmont area of North Carolina. He can be reached by e-mail at [dtotsch@wfu.edu](mailto:dtotsch@wfu.edu).*

## A Few Winners

### MISC

#### *Autoconf*

Those of you who have compiled and built various GNU software products such as *gcc* and *emacs* will undoubtedly remember that you had only to run *configure* in order for the software to automatically determine your hardware and software environment so that the build would succeed. The Free Software Foundation has announced the new release of its *Autoconf* program that produces shell scripts for configuring software packages for various systems. *Autoconf* Version 2.1 is now available by anonymous ftp from *prep.ai.mit.edu* [18.71.0.38] in the file *pub/gnu/autoconf2.0.tar.gz* (352k). Diffs from previous versions are not available, as they would be larger than the distribution.

The contributor of the software writes, "Autoconf is an extensible package of m4 macros and shell scripts that creates a non-interactive configuration script for a package from a template file. The template file lists the operating system features that the package can use, in the form of m4 macro calls, and can also contain arbitrary shell commands. Autoconf requires GNU m4. The configuration scripts produced by Autoconf are independent of Autoconf when they are run, so their users do not need to have Autoconf (or GNU m4)."

#### *trace*

And now for one of the neater pieces of software that I have seen in a while. A *trace* program for HP-UX 700 series systems! For those of you familiar with the SunOS *trace* program or the Solaris *truss* program, this is a great "it's about time HP had this" utility.

With *trace*, it is now possible to trace

system calls and print them symbolically. The program is great for reverse engineering applications. You can use it for figuring out why an application keeps bombing out. I have already used this trace program to find out what file a program was trying to reference when the program bombed out.

This trace program prints out both system calls and optionally kernel traces of programs. It compiled with almost no problems on an HP-UX 9.05 system (it should do so on any HP-UX 9.x system). To build the program you also need Perl Version 4.036 or better.

I did have to uncomment out one line in the *Makefile* but this had been documented in the *README* file.

I tried porting the program to a Series 800 machine. After about one hour of work, the program did compile and execute. Unfortunately, that was when I realized that most of the instrumentation needed for the system trace was missing from the operating system. In other words, under HP-UX 9.00 or 9.04, *trace* is worthless. *trace* is only for Series 700 computers.

This great program was written by Kartik Subbarao of the HP Workstation Systems Division (*subbarao@fc.hp.com*). Thank you Kartik! The latest version (the author went through three versions very quickly) of *trace* is 1.3. It is accessible via ftp from *iworks.ecn.uiowa.edu* in *pub/comp.hp*.

### COMP.SOURCES.MISC

#### *rushcount*

Most of the program submissions are considered serious submissions. Even the games distributed are serious in that they are the results of many, many hours of effort on the part of the developers of



that software. On occasion, however, a humorous submission can be found. Whether you like or do not like Rush Limbaugh, you are probably aware of his "America Held Hostage" counter: how many days are left in the current administration. For those of you who are into such trivia, Robert Perlberg of Dean Witter Reynolds, Inc., has submitted his *rushcount* program that generates the various counts that Limbaugh references at the beginning of each of his shows.

As Perlberg writes, "The spirit of this program does not necessarily reflect the political opinions of the author. I just thought it would be a nice programming problem and some people would get a kick out of it."

Perlberg can be reached at *dwr-sun4!perl@murphy.com* or *perl%dwr-sun4@philabs.com*. The program was posted as volume 45, issue 62.

## Perl

Larry Wall of Netlabs (*lwall@netlabs.com*) has finally released Version 5 of his Perl language. Perl ("Practical Extraction and Report Language") is meant to be a replacement for shell scripts, *awk*, and *sed* all in one package. I have been using Perl Version 4 for a few months now and must say that indeed once you learn Perl, you will not want to do your pattern matching and report extracting in any other language. The difficulty with Perl, however, is that the syntax is not particularly easier than *sed* or *awk*—it's just different. This unfortunately translates into a sizable learning curve if you are to become fluent in Perl.

On the plus side, however, you don't need to know much about Perl to make it work for you. O'Reilly and Associates publishes two books on Perl that take

you through the learning experience with real programs and examples. The books are indispensable for learning this language. Perl is really worth looking at. Personally, I am going to continue using Perl Version 4 for a few months longer only because of the wide availability of this version (it even runs on PCs with DOS). Perl Version 5 for DOS and Macintosh computers will be available soon. Perl was submitted on volume 45, issue 64 (in 64 parts).

## dtree

*dtree* is a cute and useful utility that presents a quick and dirty character-based graphical view of the directories on your system. Its output looks something like this:

```
l-df-----
l-ftw-----
|
|           l-bin-src-
|           l-date----
l-gnu-----l-install-
|           l-lib-----
l-src-l     l-libc-----
|           l-tput-----
l-misc-----
l-patches-----
l-printf-----
l-qterm-----
```

The program was written by Dave Borman and submitted as volume 47, issue 85. It's a small program that you should be able to compile and use very quickly. I've added it to my collection of utilities.

## COMP.SOURCES.X

### xsokoban

*xsokoban* is a tricky puzzle game with 90 levels of complexity to solve. The object of the game is to push all the balls

into the score area. You must always be behind the ball when you push it (therefore, if the ball ends up in a corner, you're stuck). It's a neat game; once I had gotten the hang of it, I wanted to continue playing. I hadn't heard of the game before this posting, but since then I have found a copy that runs under MS-DOS with Windows 3.1 (my oldest daughter has become addicted to the game—it was either get a copy of this game that runs under DOS or give her access to my UNIX workstation).

One of the really interesting things about the game is the way you keep the score information. In *one* mode, the information is maintained on a local file. In the *WWW* mode, the score information is actually kept on a public *xsokoban* server maintained by Andrew Myers. You are essentially competing in this game against people from all over the world! The one drawback to running the program with a distributed scorekeeper is that it is quite slow starting up. I believe the delay is the download of all the previous scores.

The documentation references a site where you can get more information about *xsokoban* via a *WWW* client (such as Mosaic). I went to that site, <http://clef.lcs.mit.edu/~andru/xsokoban.html>, and found that there was an even newer version (I had just gotten Version 3.2e) called 3.2f of the software available. I downloaded it and rebuilt my game.

Building this software on an HP system is quite easy. The author suggests that you build the software by including another package called *xpm* (I'm not really sure what it does). The installation notes tell you from where you can download this software. Building both packages posed no problems other than the following two gotchas. First, do a

`mkdir X11` in the *xpm-3.4c* directory. Second, modify the file *config\_local.h* by adding the following statement:

```
#define NEED_NETINET_IN 1
```

If you don't do this, you'll get unresolved references to variables *htons* and *ntohs*.

## ALT.SOURCES

### *chtm*

From Kevin Ruddy of Powerdog Industries comes a really nifty little utility called *chtm*. This program is similar in concept to programs such as *chown* and *chmod*. *chtm* changes the various file times associated with a file. It has lots of options including such things as changing file times recursively down a directory. It has a *Makefile* option ready to go for HP-UX systems. Unfortunately, there appears to be a minor error in it. The author of the software is under the impression that HP systems do not include the system procedure *strftime()*. My HP 9000/735 (running HP-UX 9.05) does have it. So just comment out the line that says "FUNCTIONS = strptime.o" (that should be line 19).

I also submitted a couple of small changes to Kevin that made the program work on my RS/6000; he will be including the changes in a future version. This program is available from *ftp.powerdog.com* in *pub/chtm*.

### *pdksh*

Just about every major UNIX computer manufacturer, including HP, includes the three "major" shells: the Bourne shell (*sh*), the C shell (*csh*), and the Korn shell (*ksh*). Of the various platforms I work on, only SunOS (not

the new Solaris) does not include *ksh*. And now, Michael Rendell of Memorial University of Newfoundland (Canada) has submitted a public domain Korn shell that is a clone of the AT&T Korn shell. While I'm not sure who needs such a program (how about porting it to a PC?), it might be fun to see how a shell is written.

This program is available from site *ftp.cs.mun.ca* in directory */pub/pdksh* as file *pdksh-5.1.0.tar.gz*. It has been ported to Suns, HPs, DecStations, and PCs running Linux. While the program is rather complete, a few features are still missing—specifically, exported aliases and functions, set -t, ERRNO, LINEONO, and LINES parameters, extended file globbing/pattern matching and trap DEBUG.

However, for those multi-platform sites looking for a good (something better than Bourne shell) consistent shell to use with all their applications, this might meet the requirement.

### *xmcolor*

I've needed this program for a long time. I frequently need to choose a color for an application when the default colors aren't to my taste (or rather, aren't to my sight). An example might be changing the background color of an xterm window. There are two ways to define a color using x. The first way defines the color as three 4-character hex codes (the color 'coral' for example is #FFFF7F7F5050). The second way requires looking at the color names as defined in the file */usr/lib/X11/rgb.txt*. What I have always done in the past is to pick one of the color names from this file and try it out. If it looked good, I would choose it; if not, I would pick another.

*xmcolor* is a simple Motif-based color

mixer utility that displays the color represented by the hex code displayed. The hex code can be entered manually. In addition, there are red, green, and blue sliders that allow you to mix the three principal colors to make any color you want (the equivalent hex code is also displayed). But what I like the most about this program is that I can also choose from the complete list of colors defined in *rgb.txt* and view that color by simply clicking the mouse on the color name. The software is available from *ftp.x.org* as */contrib/applications/xmcolor/xmcolor1.0.tar.gz*. This program is simple but useful.

## COMP.SYS.HP.HPUX

### *xmcd*

An interesting contribution arrived in this newsgroup from Ti Kan. *xmcd* (Version 1.3) is a Motif CD player package. This package includes an X11/Motif-based CD player utility as well as a command line driven CD audio player. It is supported on many platforms including HP-UX 9.x systems. Source code is available via ftp from *ftp.x.org* in the */contrib/applications/xmcd* directory. In addition to the sources, this directory also includes an *xmcd* CD database. Unfortunately, I haven't tried this software so I cannot attest to its quality. But it sounded (get it?) interesting. ■

---

*Joe Berry is a senior software developer at Landmark Systems Corporation in Vienna, Virginia. He is one of the authors of Landmark's performance monitor, TMON for UNIX. A former HP 3000 systems specialist for Hewlett-Packard, he has been in the computer industry for more than 20 years. He can be reached at joe@landmark.com.*





**18-22 JUNE 1995 • STUTTGART, GERMANY**

Fast changing needs driven by increasingly competitive markets are forcing the pace for IT professionals. Consequently, building competence in new and key technologies is a major focus for the IUG '95 conference, through papers, tutorials, forum sessions and strategic presentations.

New this year are the twin MPE and HP-UX Competence Centres, a Technical Workstation Laboratory, and optional Pre-Conference Workshops.

You are invited to share your skills and experience with other HP users at this, the largest and most comprehensive gathering of Hewlett-Packard MPE, HP-UX, RTE and CAD/CAM professionals in Europe,

Areas in which strategic content papers are sought include: *emerging technologies, interoperability, desktop integration, HP-UX 10.0x and Windows '95.*

Electronic submissions are encouraged. You may download a submission form from the HP Systems Forum on Compuserve (go `cis:hpsys`, browse General Library). You may also request a form via HP Desk (Andrew Butler/HPGRMY) or via Internet `70624,363@compuserve.com`.

You can also request a submission form by sending a fax message to +44 1323 422072.

For more information on exhibiting in the trade exhibition, contact Dieter Grey on telephone +49 711 976 710, fax +49 711 976 7116

*Building Competence  
in a Challenging World...*

CIRCLE 114 ON READER SERVICE CARD

by Larry Headlund

## I18N

INTERNATIONALIZATION (THE ACRONYM I18N comes from the eighteen letters between I and N) is a goal, a set of tools, and a minefield of competing standards. X has an important role to play in internationalization.

### *The Why and What*

Internationalization, which I define as programs coded and designed to work in different languages, exists because there are different languages. If we all used English or Latin or Esperanto or whatever, computer programs would be written to that single target and we would be done with it. Since we want our programs to be used by (and sold to) as wide a market as possible, we can't restrict ourselves to just speakers of our mother tongue. Those with time and money to waste could recode their applications for each language, but the rest of us need a better way.

For a brief instant at the birth of graphical user environments, it was thought that maybe we could finesse all this through icons. Icons would be language-independent and those cute little pictures would be universal. It didn't work out that way. It turned out that many icons were culturally dependent. A prime example was the mailbox with the flag up to let you know that some e-mail had arrived. Instantly understood by the country-bred American, comprehensible to other Americans, meaningless to the rest of the world. A more fundamental problem is that some things don't lend themselves to pictures. There is no universally graspable symbol found so far for *undo*, to choose one case. This should be clear if we contemplate Chinese. Written Chinese is an iconographic language and the thousands of years in its development should lead to the clearest expression possible. Try to make sense

of a page of Chinese if you haven't memorized the characters. The pictorial significance, if any, of the characters is useful as an aid to memorization, not as a key to deciphering them.

### *How*

A first step is to isolate the language-dependent parts of your code. Note how this parallels the GUI design principle of separating the presentation and the functionality. Start by getting any strings out of your code and into a separate file. The program *strings(1)* is a tool for getting a list of all the strings in a file, useful if you are internationalizing an existing program. In a non-X world, you would put all the strings in a named file and access them from there. You could idiosyncratically name the file and use your own custom functions for access, but there are standard utilities for this. Check out the *catopen(3C)* and *catgets(3C)* man pages for details. This family of functions uses the LANG environmental variable. Hence your different language files will have \$LANG somewhere in their path name. Don't forget to make your single character responses, i.e., [YyNn], internationalized also. It is natural in X to do all this with the resource files.

The accepted way to organize your resource files for multiple languages is in subdirectories under the *app-defaults* directory. Each subdirectory has the name of a LANG value. This is the way HP itself handles its National Language Input/Output (NLIO) programs and I see no advantage in being inconsistent. So if you have a program *foo* with resource file *Foo*, you will have resource files *app-defaults/french/Foo*, *app-defaults/chinese-s/Foo*, etc. for each language supported as well as an *app-defaults/Foo*. This last is for when the LANG variable is not set.

These arrangements do cause me a



# Interex '95 Conference & Expo: New Offerings

**A lot of new and exciting elements will be added to this year's Conference & Expo. Here is an overview of what you can expect.**

## **Interex Management Symposium:**

1995 marks the first time that the Interex Management Symposium will run in conjunction with the main conference. Scheduled for Monday, August 14th, the Management Symposium will be led by Dr. James Wetherbe, Professor and Director of the Management Information Systems Research Center at the University of Minnesota and the most sought-after speaker in Interex conference history!

## **HP Manufacturing Productivity Users' Conference:**

New this year, the seventh annual HP Manufacturing Productivity Users' Conference will run concurrently with the Interex Conference & Expo. This unique event is designed for users of HP MMII products as well as all of HP's manufacturing, financial, and maintenance application users. All attendees of the MP Users' Conference will also have access to the Interex exhibits.

## **Training Seminars:**

Expanded Program! Interex will be expanding last year's very successful seminar program. In Toronto, we are offering eight outstanding seminars on critical and timely subjects. Seminar topics include: *Using MPE and Unix Together*, *Migrating to HP-UX 10.0x*, *An Overview of Client-Server Application Development Tools*, *Building a Data Warehouse*, *Networking Today and Tomorrow*, *HP-UX & Internet Security*, *Systems Management: Human Factors in Computer Systems*, and *An Overview of IMAGE/SQL*.

## **HP Solutions Center:**

This hands-on lab will display all of HP's UNIX systems as well as MPE and HP hardware. Designed to give attendees the opportunity to explore and really understand the computing solutions HP has to offer, the Center is an ideal place to discover new computing solutions.

## **Client-Server Roundtable:**

With client-server technology, the question is no longer *if* but rather *when* and *how*. In this interactive, multimedia presentation, a large panel consisting of both users and vendors will address a variety of key client-server issues.

**Look for your complete  
conference brochure in  
the mail this month!  
Or, call 800.990.EXPO  
for information.**

**interex**

## **Interex '95 Conference & Expo**

**"Building, Managing, & Using Key HP Technologies"**  
August 14-18, 1995 ■ Toronto, Ontario, Canada

*The International Association of Hewlett-Packard Computing Professionals*

problem with my favored GUI programming tool. As readers of this column know, I am partial to David Smyth's Widget Control Language (WCL). With this tool much of the functionality and all the appearance of an application are defined within the resource files for that application. I say files, plural, because WCL provides a way for an application to be broken up into multiple files loaded from the master resource file. Now good design principles, and particularly object-oriented design, keep the specifications for each module together and local to that module. I even label with comment header *!Public* those parts of the resource file such as text strings, label strings, and fonts, that a user can modify, and use *!Private* for the more fundamental properties. You see the problem? If I follow all these rules, I am forced to have the structure of the program duplicated in multiple resource files for each language. This means that modifications (enhancements and defect fixes) to the programs must update multiple files. The only way around this I can see is to relax the locality restriction and have the master resource file set, and therefore have the master resource file aware of the components of modules.

Okay, we have all the language-dependent parts isolated. Are we done? No, because there are different alphabets as well as different languages. Even restricting ourselves to Western European languages, French has acute and grave accents, German and Scandinavian languages have umlauts and less pronounceable additions, Spanish has *ll* as a distinct character (you didn't forget to make your alphabetic sorting language-dependent, did you?), and so on. You won't see any of these characters on keys of the standard keyboard.

In the old days, some countries

adapted by accepting mappings, usually of characters such as [ or ], to characters of their national alphabets. This had some interesting side effects. Some printers would print out the standard ASCII character, some would print out the mapped character. This made for interesting reading when you sent, say, a C program by Telex. (For the youths in the audience, Telex is sort of a cross between fax and e-mail. You typed your message into a special Telex machine and the message was transferred to a similar machine on the other end of a telephone connection. Telex is far more efficient for transferring text than fax, but only text can be sent. The Telex address on your business card had some of the same cachet in those antediluvian days as an Internet address does now. For a while in the early 1980s Western Union offered dial-up computer accounts that allowed you to send and receive Telexes from your personal computer. You still see Telex machines, especially in Europe and Asia and in U. S. businesses that do a lot of overseas business.)

This ambiguity of display sometimes can be eliminated in an eight-bit or bigger world. If you look at an ASCII table for the full 255 characters, the inclusion of which is required by law for every computer book, you see that above the 127 characters that English fits into are some national characters, which is how English speakers refer to characters that are not in our national alphabet. Most dumb terminals will display them, given the correct 8-bit code. You may have been treated to a sampling of these characters while attempting to log in with your parity set incorrectly.

There is another approach to the display problem: multiple fonts. Most common with printers, but available on some dumb terminals, this replaces the standard

mapping with a new character set. One very common example of this is mapping the ASCII octothorpe (#), what we call in the U. S. the pound sign, to the English currency symbol of the same name. The advantage of this is that you can get non-ASCII characters in a 7-bit world. Portability is a real problem, unless you know you have identical equipment at all sites.

Even with 8-bit characters, the alert reader will notice a problem. There are no keys for these characters. Mapping keys locks you out of the normal characters. Monster-sized keyboards have been tried, but not too successfully. The most popular solution (anyone suggesting *echo "0nnn"* goes to the back of the class, except for printer programs) is to map two-key combinations to the new characters. This requires a special key, a compose key, to tell the terminal that what is coming is a multiple-character combination to be mapped to a single displayed character. Not the most convenient solution, but one that has proved acceptable.

So with input and output taken care of in a more or less standard keyboard and an 8-bit character, are we done? Not by a long shot. Note that above I said Western European alphabets. Without going too far east, we find the Greek alphabet, the Cyrillic (Russian) alphabet, Arabic, and more. Anyone can see that we are not going to shoehorn all these characters into 8 bits. Not to mention Chinese, Japanese, and Korean with their thousands of characters. We have to go to 2 bytes, 16 bits.

We will explore the world of 16 bits in the next column. □

---

*Larry Headlund is president of Eikonal Systems and has been working with commercial UNIX since 1982 and with X since 1987. He can be reached at [lmh@world.std.com](mailto:lmh@world.std.com) or 617-482 3345.*



## Share Your Expertise

Submit an article to  
hp-ux/usr

hp-ux/usr editor Michael Ehrhardt seeks well-written user-submitted articles that address the real problems of both the new HP-UX user and the experienced administrator. The overriding criterion for selecting articles will be their excellence in both content and presentation.

Authors of articles chosen to appear in *hp-ux/usr* will receive \$65 per typeset page. Authors of articles that review hardware and software pertaining to HP-UX will receive an additional bonus of \$300 to \$800, depending upon the complexity of the review.

The preferred format for submitting copy is Word for Windows, followed in order of preference by Word for the MAC, WordPerfect, or pure ASCII text. Copy should be sent via Internet e-mail or on floppy disks. Any graphics or figures should be submitted in TIFF format.

For more information, contact  
Michael Ehrhardt  
at (800) INTEREX,  
(408) 747-0227, or  
Ehrhardt@interex.org

The International Association of  
Hewlett-Packard Computing  
Professionals

interex

## Hewlett-Packard 9000 It's Our Specialty

**200/300 Series**  
216/236/217  
310/320/330  
350/360/370  
318/319/340  
345/375/380

**400 Series**  
425e  
425t  
425s

**700 Series**  
705/710  
715/720  
730/750

We also carry memory and interface for all of our workstations

**Printers**  
2225A/B/C/D  
3630A PaintJet  
C1602A PaintJet XL  
LaserJet II/IIID/IIIP  
LaserJet III/IIID  
LaserJet IIIP, IIISI

**Specials**  
7585A/B Plotters  
HP Vectras  
380C+ Workstations

**Mass Storage**  
9121/9122  
9153A/B/C  
7957A/B  
7958A/B/S  
7959B/S  
7963B  
C2213A/D  
DAT Drives  
CD ROMs  
Optical Drives

**Plotters**  
7440A ColorPro  
7475A 6-Pen  
7550A/B Self-Feed  
7570A DraftPro  
7575A DXL, 7576A EXL  
7595A/B/C DraftMaster I SX  
7596A/B/C DraftMaster II RX  
Electrostatic  
DesignJet



We offer large discounts,  
outstanding service  
and immediate delivery.

**TED DASHER & ASSOCIATES**

PH: 800-638-4833

FAX: 205-591-1108

E-mail: sales@dasher.com

CIRCLE 49 ON READER SERVICE CARD

## Finally!

## Real Printer and Print Queue Management for UNIX!

**LP Plus**  
Puts YOU in Complete Control  
of your UNIX Print Operations

"LP Plus has filled a vast void UNIX has in dealing with printer spooling needs. Fantastic product!"

Gary Dame, MIS Director-Pacific States CIP

The print command you get with UNIX gives you the "bare bones" of printing, and not a bit more.

**LP Plus** delivers the control and flexibility needed to manage a dynamic print operation. It's a product designed by people who realize that priorities change, printers break down, and sometimes only one page of a 50-page report needs to be printed.

### LP Plus...

- ◆ Delivers only the printing you want, a page at a time, a range of pages, or an entire job
- ◆ Lets you suspend and start printing at any page, or at the last page printed
- ◆ Provides real-time printer and queue status
- ◆ Offers true bi-directional UNIX/Novell printing\*
- ◆ Provides complete lpd/lpr compatible printing
- ◆ Lets you decide which spool files to retain, which ones to purge, ... and when

Whether your system has two serial printers or 200 network printers, LP Plus lets users and administrators manage their print environment.

Call 1 800-274-1627, for a **free evaluation** copy. Use the complete product for 30 days. If you are not satisfied that LP Plus greatly enhances the productivity of your print operation, simply remove LP Plus and give the print operations back to UNIX.

Digital Controls



The LP Plus Logo is a registered trademark of Digital Controls Corporation. All brand and product names appearing herein are trademarks or registered trademarks of their respective holders.

\*Requires NovPrint™ and Netware's TCP/IP (an NLM included with Netware v3.11 or later).

CIRCLE 24 ON READER SERVICE CARD



# HP 1000 Guru

**Q:** I am using the following program to create a symbolic link for a file `/DEV/TTY0` to point to the system console. When the program then opens and writes to the symbolic link, it does not send the output to LU 1, and it appears to corrupt the link file. What am I doing wrong?

Here's the program:

```
ftn7x,s
      program slink
      implicit none
      integer i,err
      integer dcbslink(16),dcb(144)
      integer FmpOpen,FmpClose,FmpWrite,FmpMakeSLink

      if (FmpMakeSLink(dcbslink,err,'1','/DEV/TTY0').lt.0) goto 76

      if (FmpOpen(dcb,err,'/DEV/TTY0','rwl',1).lt.0) goto 76

      write(1,*) err

      if (FmpWrite(dcb,err,16Hello, world... ,16).lt.0) goto 76

75    goto 77
76    call FmpReportError (err,'/dev/tty0')
77    err = FmpClose (dcb,err)
      end
```

A directory list of the link file shows the following:

```
lrw----r--  1 walt  nogroup  1 Feb 6 14:49 tty0 -> hello, world
```

**A:** The problem with this program is the *FmpOpen* call. Though you are passing *FmpOpen* the name of a symbolic link file, you *do not* want to use the 'l' option. The 'l' option is used only when you want to open the symbolic link file itself. In this case, since you want to open the destination, LU 1, do not use the 'l' option. The *FmpOpen* should look like this:

```
if (FmpOpen(dcb,err,'/DEV/TTY0','rw',1).lt.0) goto 76
```

This will "open" LU 1 and the *FmpWrite* will "do the right thing."

**Q:** For years, my system disk configuration has included a 400-track LU 16 and a 943-track LU 17. This is the way the original RTE-A Primary system was configured. I see now that the 6.1 Primary has changed the track map so that LU 16 is 4096 tracks. Since I boot from LU 16/17, is there any way to reconfigure these LUs without using



a second disk as a temporary boot LU? I have only the one disk on my system.

**A:** Yes this can be done. It will require planning and adequate free space on the disk in order to move */SYSTEM* and */PROGRAMS* to an LU that resides past LU 16/17. Perhaps a "picture" of the disk configuration would help:

Current configuration:

LU	#TRACKS	CONTENTS
16	400	BOOTEX
17	943	<i>/SYSTEM</i> & <i>/PROGRAMS</i> (Boot LU)
18	320	<i>/USERS</i>
19	266	<i>/SCRATCH</i>
20	352	misc
21	2229	misc
22	821	misc
23	5413	misc

For example, let's say we want to reconfigure LUs 16-17 as a single LU, using LU 23 as our temporary boot LU.

The steps are as follows:

1. Perform an *ASAVE* of LU 16 and 17
2. Create a */TARGETPROGRAMS* and */TARGETSYSTEM* on LU 23, making sure there is enough free space to hold the files from */PROGRAMS* and */SYSTEM*. *FOWN* can be used to determine how large these directories are.
3. Copy */PROGRAMS* and */SYSTEM* to */TARGETPROGRAMS* and */TARGETSYSTEM*, respectively.
4. Regenerate your system to combine LU 16 and 17 into one 1343-track LU, eliminating LU 17. Do *not* change any parameters for any other disk LUs, especially LU 23 in this example. Place the new system and snap file in */TARGETSYSTEM*.
5. Create a boot command file that RPs programs from */TARGETPROGRAMS*, and references the new system and snap and swap file in */TARGETSYSTEM*. Place this boot command file in */TARGETSYSTEM*.
6. Reinstall BOOTEX (on LU 16) to mount LU 23: (Assumes FMGR LU 16)

INSTL

Enter snap file,system file,destination file,lu,source file

New\_snap\_file,New\_system\_file,BOOTEX:-32767:16,23,/RTE-A/bootex

# Turn your friend into a *usr*.

As a subscriber to *hp-ux/usr*, you already know about all the hands-on solutions you can find to your HP-UX problems in every issue. Solutions contributed by readers like you. In order to expand our pool of information, we want to turn more HP-UX users into *hp-ux/usr* readers. Because the more people contributing to the HP-UX knowledge base, the more we can all improve the performance of our systems.

## Everyone Benefits!

If you know someone who can benefit from this publication or has something to contribute, tell them about it. We'd be happy to send them a free issue. Just tell them to let us know *your* name when they call one of our Membership Representatives at **800.INTEREX** or **408.747.0227**. It's easy! And a great way to increase the expertise of all HP-UX users.

**interex**

*The International  
Association of  
Hewlett-Packard  
Computing Professionals*

7. Boot the new system using the boot command file created in step 5.
8. Once the system is booted successfully, you must re-initialize the new LU 16 as either FMGR or CI, whichever you want.

For a CI volume:

```
CI> IN,16,76 (768 to reserve room for BOOTEX)
```

For a FMGR cartridge:

```
FMGR: MC,16
FMGR-103
FMGR: IN,,-16,16,LU16 (or whatever CRN you want)
FMGR:
```

At this point, you should have a large empty LU 16 with BOOTEX still intact (the IN commands above *will not* destroy BOOTEX). If in doubt, simply run INSTL again to make sure. Now to make LU 16 the boot LU, perform the following steps (similar to above, only reversed):

1. Create a /PROGRAMS and /SYSTEM on LU 16.
2. Copy /TARGETPROGRAMS and /TARGETSYSTEM to /PROGRAMS and /SYSTEM, respectively.
3. Reinstall BOOTEX (on LU 16) to mount LU 23:

For a CI LU 16:

```
INSTL,New_snap_file,New_system_file,0,16,/RTE-A/bootex
```

For a FMGR LU 16:

```
INSTL
Enter snap file,system file,destination file,lu,source file
New_snap_file,New_system_file,BOOTEX:-32767:16,16,/RTE-A/bootex
```

4. Boot the new system using your original boot command file.

Your system should now be as it was, but with LUs 16 and 17 combined.

One word of caution: Once you start this procedure, carry it through to completion, since if the system is accidentally turned off or halted in the middle, it may not reboot. If this does happen, use your bootable ARSTR and restore the ASAVE made in step 1.

**A:** This is a question that every system manager must ask himself. Bill Hassell once said, "There are two types of computer users: those who have lost data and those who are going to some day lose data." A clearly defined, consistent backup strategy will go a long way to making such loss relatively painless.

The HP 1000 family of systems has had a plethora of backup utilities available over the years. I won't delve into all of these; rather I will describe the method I use to make backing up an RTE-A system simple, effective, and best of all, automatic.

The two primary questions about backup strategy are *how* and *how often*. The first question will be the focus of this discussion; the second is generally answered by asking yourself how much data you can afford to lose. In my case, I don't want to lose any data so I back up every night.

First of all, the system I am using is an A990 running 6.1 RTE-A. I have several tape devices available, and currently I am using a 1.3-Gbyte DDS drive. The advantages to using the DDS should be obvious: speed, storage capacity of the media, and physical storage space the tapes require. I can carry my entire system backup in my shirt pocket. Not recommended while bicycling.

In order to recover from a catastrophic system disk failure, an ASAVE backup is the easiest and best way to recover. It is possible to reconstruct a system from a fully equipped memory-based system and a full FST backup. But it certainly requires more preparation and effort. (*Note:* The 6.1 Primary system is installed in this fashion, but it includes a custom program, !RESTORE, in the memory-based system which performs all the work).

**Q:** How does the HP 1000 Guru manage his system backups?

*Continued on Page 75*



# Are You Moving?

Send your change of address to

**Member Services  
Department  
Interex  
P.O. Box 3439,  
Sunnyvale, CA  
94088-3439, USA**

**Or call**

**408.747.0227**

**Or fax**

**408.747.0947**



**interex**

*Shared Knowledge.  
Shared Power.*

HP RENTALS
HP RENTALS

## HP WORKSTATION RENTALS

### WORKSTATIONS

755	750	CRX	433 S	CRX	382	360	332
735	730	CRX-24	425 T	VRX	362	350	330
725	720	CRX-24Z	425 S	GRX	380	345	320
715	710	CRX-48Z	425 E	PVRX	375	340	310
712	705	GRX	400 S/T	EVRX	370		

### AND MORE . . .

Printers  
Plotters
X Terminals  
APOLLO DN Series
PC's  
Memory
Discs  
Test Equipment
800 Series  
Data Acquisition

TSA is THE place for daily, weekly, monthly or long term rentals of Hewlett-Packard equipment. Ask about our 6-12 month purchase plans. Equipment available for same day shipments!

Authorized  
Rental  
Company

# 1-800-422-4872

713/935-1500 • Fax 713/935-1555 • Email: info@tsa.com

2040 West Sam Houston Parkway N. • Houston, Texas 77043

HP RENTALS
HP RENTALS

CIRCLE 143 ON READER SERVICE CARD

## LISTING 1

```

* FST backup command file
*
* This script performs an incremental backup of all
* files nightly to DDS tape on REMUS.
*
* Full ASAVE performed when appropriate,
ll /walt/fst.log a
ti REMUS Incremental backup
mt 5
Quiet
Append
Clear
Keep
ba @.@.eb
Go

```

## LISTING 2

```

FTN7X,l
  program nitly_fst
  c
  ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
  c
  c  NITLY is time scheduled nightly and performs an incremental
  c  FST backup of all files that are new or have the backup bit set
  c  A fresh FST is started AFTER a full system ASAVE is performed
  c
  c  See file fst_cmd.cmd::cmdfiles for set of files being
  c  backed up.
  c
  ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
  c
  c  implicit integer(a-z)
  c  integer param

  c
  c  Schedule FST with transfer file to perform backup
  c
  c  call FmpRunProgram('fst,tr,fst_cmd.cmd::cmdfiles',param,back)
  c
  c  Schedule SENDMAIL to mail FST log file
  c
  c  call FmpRunProgram('sendmail,-k,/temp/fst.log',param,sendmail)
  c
  c  Schedule EDIT to clean up the log file for next time
  c
  c  call FmpRunProgram('edit,/temp/fst.log|4,$k/|er',param,edit)

  end

```



In my case, I simply perform an *ASAVE* of all disk LUs after any major system update/regen, or every 2 months. And of course, I have a WORKING memory-based system in order to recover in the event I lose my boot disk.

Second, I back up files nightly using *FST*. I initially create an *FST* backup tape, using a mask including the "B" qualifier, and the C option (see *Listing 1*). This performs an incremental backup using the backup bit, and then clears the backup bit. Subsequent backups are then appended to this tape nightly.

My nightly backup is time scheduled from the welcome file to run at 1 a.m., via a program. (see *Listing 2*). This program performs an *FST* backup using a command file (see *Listing 1*), logging the results to a file, and then using MAIL/1000, mails the *FST* logfile to me. This way, when I come in in the morning, I expect to have e-mail from my system with the result of the overnight backup. I do this on several systems, with the mail being sent to my central RTE-A system where I read all my e-mail. In this way, I never have to remember to check the logfile; it just appears in my e-mail. I can then review it for any problems, and delete the message.

The files that are being backed up, via */cmdfiles/fst\_cmd.cmd*, can be easily modified. The example shows a simple *@.@.eb* which backs up all files, everywhere, checking for and clearing the backup bit. In actuality, on my systems, I back up selected directories.

A consistent backup procedure will go a long way towards minimizing any data loss when it occurs. ■

*Walt Boeninger is a support engineer at the HP Response Center in Mountain View, California. He has been supporting the HP 1000 for more than 15 years.*

# HERE'S YOUR SOLUTION!

Quality products at affordable prices for

## HEWLETT-PACKARD/APOLLO®

Workstations,  
Peripherals and Upgrades



### CMI

Computer Marketing International, Inc.®

85 Flagship Drive  
No. Andover, MA 01845 USA

- NEW and REFURBISHED
- Repairs
- 100% Customer Satisfaction
- Free Technical Support
- Immediate Delivery

Tel: 800-497-4264

508-687-3700

Fax: 508-689-2031

Int'l. Fax: 508-687-4395

CIRCLE 150 ON READER SERVICE CARD

## Do You Know Where Your Security Holes Are? Find Them with SecurityAudit/UX!

Have You Heard that UNIX is Notorious for Its Lack of Security Features?  
Do You Know Where to Check to See if Your HP-UX System is Secure?  
Do You Have the Time to Do This Checking Regularly?  
Use SecurityAudit/UX To Do It All!

EVEN IF YOUR SYSTEM IS SET UP CORRECTLY (AND HOW WOULD YOU KNOW IF IT WAS?) AND HAS NO SECURITY LOOPHOLES, IT CAN BE VERY DIFFICULT TO MONITOR SYSTEM CHANGES, AND TO ENSURE THAT SECURITY ISN'T COMPROMISED. THE MAGNITUDE OF THE PROBLEM INCREASES AS THE TOTAL NUMBER OF USERS CONFIGURED AND THE TOTAL NUMBER OF FILES GROWS. IT'S EASY FOR ORDINARY USERS TO CHANGE THE SECURITY OF THEIR OWN FILES TO ALLOW OTHERS TO ACCESS THE CONTENTS. A LOOPHOLE LEFT BEHIND INADVERTENTLY OR ON PURPOSE MAY BE EXPLOITED BY A DISGRUNTLED EMPLOYEE OR A HACKER TO BREAK SYSTEM SECURITY, SOMETIMES MUCH LATER.

SecurityAudit/UX PRODUCES OVER 40 REPORTS, CONTAINING DETAILED INFORMATION ON THE FOLLOWING CLASSES OF PROBLEMS:

- User and Group-related problems, including weak passwords and non-unique identification numbers.
- File-system related problems, including historical tracking of files and detection of potential Trojan horses.
- PDF-related security problems, extended to detect changes in ACL specifications.
- Logging subsystems status display, and logfile analysis.
- Network-related status display and configuration weaknesses.

SecurityAudit/UX RUNS ON ALL HP-UX BASED 9000 SERIES 700 AND 800 SYSTEMS, AND HAS BEEN SPECIFICALLY TAILORED TO ADDRESS PECULIARITIES OF HP-UX, SUCH AS PDF, ACL AND HP'S SHADOW PASSWORDS.

**Call EUGENE VOLOKH for more info!**

**VE-SOFT**  
Purveyors of Fine HP Software  
Since 1980  
(310) 282-0420

1135 S. Beverly Drive  
Los Angeles, CA 90035 U.S.A.  
FAX (310) 785-9566

CIRCLE 40 ON READER SERVICE CARD



# CSL Perspective

IT'S THE DEAD OF WINTER in upstate New York and a lot has happened since I wrote last. Before I carry on with the discussion about the "how-to" of CSL program installation, let me get a few small items out of the way.

Many of you probably are aware that InterWorks (the HP Workstation Users Group) and Interex are working through a process leading to merger. As part of the InterWorks merger plan, Dave Shaw has joined the CSL committee. Dave has served as the InterWorks Librarian, providing leadership and organization to their large collection. Dave brings with him a lot of experience and energy and we are indeed fortunate to have him.

I would also like to announce that we're losing two members of the committee, Art Gentry and Craig Lalley. Art was the catalyst for starting the HP-UX CSL, beginning with the first Swap Tape at the Orlando Conference in 1988. Art has been a valuable resource to the organization for many years and we wish him well with his new businesses. Craig served for a year on the CSL-MPE committee and provided some much needed user experience. Craig is also an avid cyclist and will be spending much of this summer riding around the country.

With these departures and the evolution occurring within Interex, the CSL Coordinating Committee (CSLCC) has made a recommendation to the Board of Directors to abolish the existing CSL committee structure. That structure consisted of the three CSL operating committees and several members of the Interex staff. The chairman of each operating committee serves on the CSLCC along with a separate coordinating chairman. With the pending changes in committee makeup as well

as our established operating procedure of holding joint meetings, we believe the time is right for establishing a single committee structure. This single structure will initially be made up of the existing members of the operating committees, who will continue to develop the vision and policy document. Later in 1995, after establishing a business plan, we will need to re-evaluate our operational needs for the long term. Any comments or suggestions you have as the year progresses are welcome.

Now resuming our regularly scheduled program already in progress....

In the January and March issues of *hp-ux/usr*, I gave a tutorial on how to install programs from the CSL. Armed with that knowledge, you should be able to use most of the contributions successfully. This month I'll tackle the unique installation steps for the X Window and Motif contributions. Those with workstations or X terminals will want to read on.

The X Window system was developed in the mid-1980s on the MIT campus as part of Project Athena and has quickly become the de facto windowing system for UNIX workstations. X11, the current version, has undergone six releases and vendors such as HP have incorporated the current version into their operating system software. In particular, HP has provided various pieces of X11R4 and X11R5 simultaneously on HP-UX 9.xx for several years. Motif, developed by the Open Software Foundation, is a toolkit and look-and-feel extension built on X11. It, too, has gone through a few release changes and currently HP has both Version 1.1 and 1.2<sup>o</sup> on HP-UX. Unfortunately, HP has slipped up in providing complete implementations of some X11 software.



X11 consists of four major pieces. First is the X-server, a stand-alone program that manages the graphics display. Second is a set of client programs that provide basic functionality. Third are collections of C header files, corresponding to the various function and toolkit libraries, and last are the libraries themselves. It is in these last two areas that the CSL runs into potential problems. Most of the X and Motif software on the CSL assumes that all the X11 pieces exist. The Developers Toolkit has most of the libraries and header files. The missing pieces include the X11R5 versions of *libXaw*, *libXmu*, *libXext*, and their corresponding C header files. These pieces were included on HP-UX 8.x, but for some reason HP neglected to include them in 9.x.

In order to work around these discrepancies, some enterprising users have provided these missing pieces as separate CSL contributions. On the 3419 release is contribution *Xaw-5.00* (f0002), which includes the missing header files as well as precompiled libraries for HP-UX systems. Once these are installed, you are halfway there. The other contribution to install is *imake-5.03* (f0001). In a nutshell, *imake* will take a collection of configuration data (Imakefile, templates, .defs) and create a Makefile for that program. This provides machine- and operating-system independence in building the software. If you wish to learn more about *imake*, see Larry Headlund's XWATCH column in the January and February 1993 issues of *Interact*.

Once *imake* and the library contributions are installed (there are explicit installation instructions for each), the process for compilation of an X11 or Motif application is straightforward. Also remember, you need a C compiler and

\$ ls				
CHANGES	ad2c*	crolo.man	patchlevel.h	rolox.c
Imakefile	arrows.c	getopt.c	prolo.c	rolox.h
Imakefile.std	arrows.h	mrolo.ad	prolo.man	sample
MANIFEST	callback.c	mrolo.ad.h	rolo.c	sample.Z.uu
MRolo.ad	compat.c	mrolo.bm	rolo.h	xr2mr*
Makefile	compat.h	mrolo.c	roloP.h	xr2mr.man
Makefile.std	creation.c	mrolo.man	roloc.c	
README	crolo.c	myregexp.h	roloc.h	

the HP X Windows developers Toolkit as well.

Let's build *mrolo* from the 3419 release as an exercise. After unbundling *mrolo* (following the instructions in my previous columns), you will have the files in a working directory, as shown in Table 1. According to the README file, to compile this program you enter 'xmkmf' and then 'make'. Xmkmf will run *imake* against *mrolo*'s Imakefile, producing a customized Makefile for this installation. Are you getting confused yet? Actually this whole process of customizing the installation to your site-specific needs is pretty slick. After 'make' is through, you will have the executable, ready to run. You can run it from this subdirectory as a test before installing it into system directories. You may also notice the file *MRolo.ad*, the "applications default" file for the application. These files usually live in */usr/lib/X11/app-defaults* or in a personal applications default directory. Some X applications won't run correctly unless their app-defaults file is put in the correct location. We're in luck with *mrolo*; it has a default behavior.

Once you are ready to install *mrolo* in its final location, 'su' to root and enter

'make install'. If you wish to install *mrolo* on other systems, just copy the relevant files (executable, man page, app-defaults file, etc.) to the destination system along with the relevant libraries (*libXaw.a*, *libXaw.sl*, *libXmu.sl*, *libXmu.a*, *libXext.sl*, *libXext.a*). Most of the other X11 or Motif programs should be almost as straightforward. Some may require changes to directory paths or configuration data, but for the most part the stuff on the CSL will compile on HP-UX with little difficulty. ■

*Paul Gerwitz is chairman of the CSL/HP-UX committee and is a technology specialist at Eastman Kodak Company in Rochester NY. He can be reached at 716-477-3067 or e-mail at gerwitz@interex.org or gerwitz@kodak.com.*



## Industry Watch

I want my OPTV! Open TV, that is, unveiled in February by Thomson Consumer Electronics. Open TV is actually a software framework that resides on media servers at one end and set-top receivers at the other. Sun is providing the servers, workstations, and network for the system. Open TV promises a host of interactive services and entertainment such as ticket ordering, video-on-demand, and information requests. Of course, Open TV would be open to advertisements. The real entertainment will be watching the telecom, cable, satellite, and broadcast operators scrambling over one another for a position on the medium. Sun and TCE claim Open TV will work through existing broadcast networks or ATM switched networks, with point-to-point support on the way. Maybe I just want my old TV.

I won't likely get it, though. Interactive is coming at us from all directions. Digital also announced in February a new relationship with Advanced RISC Machines (ARM) and outlined plans for its piece of the interactive, multimedia game. The alliance is slated to produce low power dissipation 32-bit RISC products, dubbed StrongARM, for consumer and other interactive applications. The companies claim that StrongARM will be ideal for set-top interactive TV receivers, as well as next-generation Personal Digital Assistants, video games and multimedia "edutainment" systems, and digital imaging.

Meanwhile, IBM is looking for a place on the giving end, announcing that its System/390 and UNIX-based POWERparallel systems will support video-serving applications. IBM is positioning its big boxes as having the

bandwidth necessary to support byte-intensive video and interactive applications for everything under the sun—from the manufacturing floor, to classrooms and living rooms, to research labs. Of course, when new data compression methods emerge, bigger may no longer be better. So I can only ponder, if you're going to go interactive, is it better to give or receive? ■

---

*Industry Watch is written by James H. Gamble.*



## Join SIGUNIX via e-mail!

HP-UX server and workstation users can now join SIGUNIX, the Interex Special Interest Group (SIG) for UNIX users via e-mail.

To subscribe, send a message to [listman@interex.org](mailto:listman@interex.org). The message should state: "sub sigunix firstname lastname."

Once on the list, you'll be included in SIGUNIX communications and you'll be able to send messages to other SIGUNIX members using the [sigunix@interex.org](mailto:sigunix@interex.org) address.

**interex**

The International  
Association of  
Hewlett-Packard  
Computing Professionals

# BUY • SELL • REPAIR

# HP 9000

## PARTS • HP 3000 • UPGRADES • CPU'S

### 1-800-842-4781

**Workstations**  
INTERNATIONAL

**NEW AND REFURBISHED**

**Seagate, Kingston & Exabyte**

**Rentals available**

601 Lakeshore Parkway, Suite 1160

Minnetonka, MN 55305

PH: (612) 449-9000

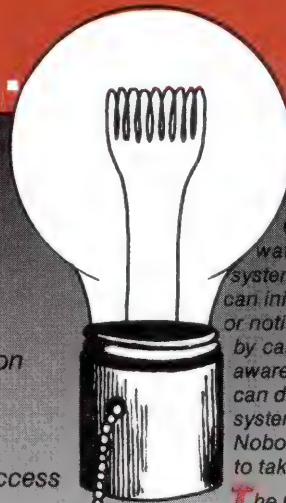
FAX: (612) 449-3198

CIRCLE 39 ON READER SERVICE CARD

## Low Cost...

## Lights Out!

- Crash or power fail detection
- User defined corrective actions
- Automate MPE command execution
- Local or remote notification
- Secured remote access
- Full console capability
- Message filtering



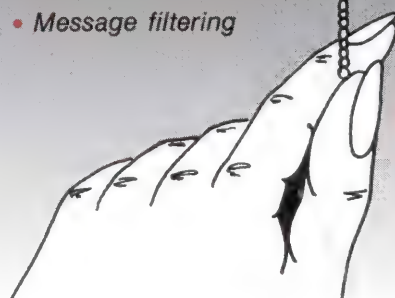
Go ahead, turn out the lights and go home with confidence. The Console Engine will dutifully keep watch on your HP3000 or HP9000 systems. It monitors system activities and can initiate user defined corrective actions or notify you by sounding a local alarm or by calling you on the phone. Once made aware of a problem, the remote operator can dial in, pass security and access the system with full console capabilities. Nobody will have to come in to the office to take action.

The Console Engine is the best low cost system attendant you can hire. Solid, reliable, always on the job the Console Engine lets you manage a single system or a network of machines. Rest Assured...



**TELAMON has it handled!**

492 Ninth Street, Suite 310 • Oakland, CA 94607-4098  
(800) 622-0630 • (916) 622-0630 • (916) 622-0738 FAX



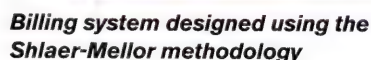
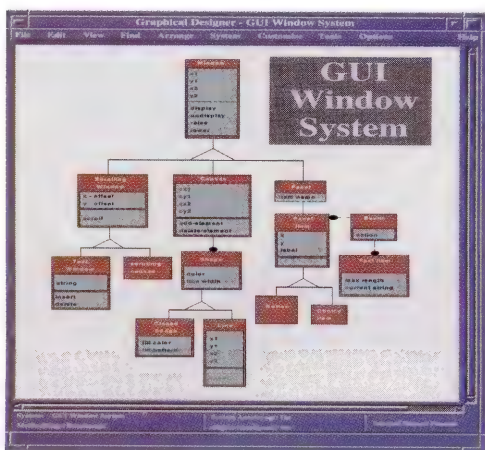
CIRCLE 135 ON READER SERVICE CARD



Greg Schottland, President of Advanced Software Technologies, Inc. (ASTI), believes that CASE tools have a bad reputation. Having been a customer of CASE tools for 10 years, he observed that such tools have “overpromised and underdelivered.” Specifically, current products are not user-friendly, which is why “if you were to pick up a phone and call a developer, chances are he doesn’t use a design tool.”

Graphical Designer's ease of use and extensibility (or meta-CASE features)

By combining ease of use with “forward-engineering” or “meta-CASE” features, Graphical Designer can adapt to support other methods quickly. Schottland recalled that one company used a beta version of the tool to build a CASE method from scratch within a week. On another occasion, one of





ASTI's engineers took a faxed diagram of designs, generated a method in Graphical Designer, and had it ready for the client in four hours. Schottland boasted, "That's something other (tools) can't do."

The tool provides a GUI to all the components of a design methodology, so users can define new objects, relationships, and the manner in which code is output. Users can also modify how design objects should be rendered on the drawing area and as icons. Entirely new objects, relationships, and code generation specifics can also be created to form a customized methodology.

Users can generate ready-to-compile C, C++, and Ada source code and can customize code in the following manner: by modifying how code is generated for an existing design symbol or relations; by specifying how code is to be generated for a newly created symbol; by generating a new language from a pre-existing or new methodology; and by generating other forms of output from a design (data dictionary, documents, etc.).

Schottland attributes the tool's flexibility to its modular design. The developers took two years to develop the original product, with the belief that it was best to "build a big base before moving forward," he recalled. Specifically, their strategy was to "build modules that make sense, and not couple things together too much."

This architecture enables the user to customize the method database in the tool preparation phase. This database is separate from the system database, which stores the designs created. Because of this design, "You're assured of consistency, because you're always coming out of one database," Schottland said.

Another advantage to this architecture is its ability to work with third-party databases, such as Oracle, and third-party development frameworks, such as HP SoftBench. Other tools integrate with third-party products, Schottland acknowledged, but he said Graphical Designer is unique in that, from its inception, it was designed to be a part of a process separate from the tool—the only tool to be "process-neutral."

He recalled that vendors used to have to supply everything in their CASE tools, because there was no development framework. Schottland commented, "(tool makers) sort of thought (tools) were going to be the center of the universe, as far as design goes." Noting that CASE tools are appropriate for the analysis, design, and implementation phases of the software development life cycle, he added that tool developers "need to understand that (CASE tools) fit on top of the other stuff," such as the need to establish the application requirements and to test the application.

Graphical Designer Version 1.1 was scheduled to be released in April of 1995. This new version adds reverse engineering and reengineering capabilities. It runs on HP and Silicon Graphics workstations. Pricing starts at \$4,999 for the first seat and drops to \$999 after the sixth seat. Training, telephone support, and consulting services are available.

Contact Advanced Software Technologies, Inc., 7800 S. Elati Street, Suite 300, Littleton, Colorado 80120, phone (303) 730-7981, e-mail: [info@advancedsw.com](mailto:info@advancedsw.com). ■

---

*Michelle Pollace, the New Products editor for hp-ux/usr, writes Product Focus.*

## Protect your investment in HP technology.

As a member of Interex, the International Association of Hewlett-Packard Computing Professionals, you can influence the decisionmaking process that determines the fate of your HP equipment. Through our many advocacy channels to Hewlett-Packard, our members actually become involved in the development process. These well established channels include:

- Interex annual surveys
- Conference roundtables
- Special Interest Groups

### Make yourself heard!

Find out more about advocacy and all of the benefits of Interex membership. Just call one of our Membership Representatives at **800.INTEREX.408.747.0227**, or e-mail us at [membership@interex.org](mailto:membership@interex.org).

**interex**

*The International  
Association of  
Hewlett-Packard  
Computing Professionals*



# New Products

## UNIX-Novell Printing

Digital Controls Corporation has announced NovPrint, a NetWare NLM that provides bidirectional UNIX-Novell printing. Using NovPrint, UNIX users can route print jobs from UNIX hosts into a NetWare queue so work can be accessed by printers on file servers, NetWare workstations, and by print-dedicated PCs. UNIX commands, such as *lp* and *lpr*, will not change when printing to NetWare printers because the line printer daemon (*lpd*) is emulated.

NetWare clients can route print jobs from NetWare server print queues to printers on UNIX hosts or terminal servers supporting TCP/IP connections. Jobs can be routed to or from any NetWare print queue on the network. Existing NetWare print queues are used, so utilities, including CAPTURE and NPRINT, will not change for NetWare users printing to UNIX printers.

NovPrint is available for NetWare 3.11 or greater and is priced at \$595. The product is available through UniDirect and other distributors.

Contact Digital Controls Corporation, 305 Pioneer Blvd., Springboro, Ohio 45066, phone: (800) 274-1627 or (513) 746-8118.

## Native OS/2, Windows 95

MiniSoft Inc.'s terminal emulator, MiniSoft 92 for Windows, now incorporates 32-bit architecture for emulation of OS/2 and Windows 95 operating systems. Version 3.5 of MiniSoft 92 for Windows (Win92) also offers enhanced 16-bit capability.

Users can now make NS/VT or Telnet connections with any TCP/IP stack that supplies its own WinSock. In addition, Win92 includes an optional WinSock-only connection (WS92),

which is optimized for operating over third-party stacks. Besides taking significantly less memory, WS92 uses just 250,000 bytes of disk storage.

Win92 now features network file transfer that allows users to move files at network speed: Network File Transfer for transfers from the HP 3000 and an FTP Client for transfers from UNIX systems. Object Linking and Embedding (OLE) in Windows is also supported.

Full-featured VT320 terminal emulation, including full keyboard remapping, is now added. In addition, the emulator's command language now includes more than two dozen scripting commands, which are fully documented in the new manual. Win92 Version 3.5 also includes new scalable fonts that shrink or grow according to the size of the display. In addition, users can position the Win92 window anywhere on the screen and save its position in a configuration file.

Win92 costs \$179 per copy. Volume discounts and site licenses are available.

Contact MiniSoft, Inc., 312 Maple Avenue, Suite A, Snohomish, Washington 98290, phone: (800) 682-0200, fax: (206) 568-2923.

## Multiplatform Configuration Management

Diamond Optimum Systems has announced Release 3.5 of its configuration management toolset, VCS, which utilizes client-server technology to provide a single point of control for software development activities on UNIX, MPE/iX, and desktop platforms. The complete solution includes automatic documentation, impact analysis, version control, and software distribution.

Release 3.5 fully supports environments consisting of the HP-UX, IBM



# Did all your jobs make it through the night?



## AUTOSYS brings reliable scheduling and job control to Unix.

*You've seen the problems:* databases not loaded, reports not printed, jobs missing in action. *Now meet the solution.* Engineered to support Unix production systems, AUTOSYS

delivers the reliability you need with intelligent scheduling functionality. From automatic restart and recovery to high availability features, AUTOSYS makes sure your jobs run.

- Centralized control for network-wide job execution
- Supports heterogeneous networks
- Dynamic load balancing
- GUI and command line interface
- Scheduling by job dependencies, date/time or file arrival
- Complete historic audit trail
- Realtime operator console
- Open client/server architecture

*AUTOSYS has a proven track record in large Unix operations - over two years in production with nightly streams in excess of 10,000 jobs, distributed over hundreds of servers.*

Let AUTOSYS get you through the night.

**PLATINUM**  
TECHNOLOGY

1.800.492.7528 FOR MORE INFORMATION

PLATINUM technology, inc., 1815 South Meyers Road, Oakbrook Terrace, Illinois 60181 Phone 708.620.5000 Fax 708.691.0718  
©1995 PLATINUM technology, inc.

CIRCLE 13 ON READER SERVICE CARD

## Object-Oriented Development

ObjectSpace, Inc. has announced a new object-oriented product line, containing ObjectSockets, ObjectSystems, ObjectMetrics, and ObjectCatalog, to give developers a choice of products for Smalltalk and C++ environments.

ObjectSystems is a complete C++ framework for professional cross-platform UNIX systems development. It is an object-oriented layer between the application and UNIX that hides the details of difficult-to-use system calls, error detection, and cryptic flags.

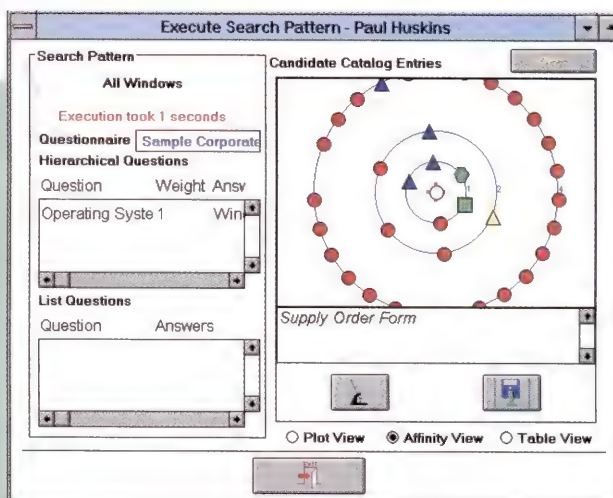
ObjectSockets is a class library with more than 40 classes representing all aspects of TCP/IP communications, including TCP sockets, UDP sockets, IP addresses, hosts, networks, protocols, and services. It hides the details of WinSock API calls, error detection, and cryptic flags. ObjectSockets comes with full source code, a comprehensive user guide, and a tutorial.

ObjectMetrics enables SmallTalk programmers to obtain valuable metrics that indicate problem areas such as overly complex code and unnecessary coupling between modules. It also uses an intuitive GUI.

ObjectCatalog's distributed publish and search capabilities allow enterprises the ability and benefits of reuse.

Pricing for the products are ObjectSystems, \$875 per user; ObjectMetrics, \$595 per user; ObjectSockets, \$695 per user. Site licensing is available. Prices for ObjectCatalog, scheduled for release by the end of 1994, had not been announced at time of writing.

Contact ObjectSpace, Inc., 14881 Quorum Drive, Suite 400, Dallas, Texas 75240, phone: (214) 934-2496, fax: (214) 663-3959.



## CNA/CNE Certification Study Guide

McGraw-Hill has announced *The Novell CNA/CNE Study Guide*, said to

provide test-takers with all the information they need to pass the two primary certification exams available through Novell: Certified NetWare Engineer (CNE) and Certified NetWare Administrator (CNA).

Through the use of hands-on learning techniques and a goal-oriented approach to studying, certification experts John Paul Mueller, CNE, and Robert A. Williams, CNE, CNI, help readers get their certifications faster and with more certainty than just about any other method, the publisher notes.

For each course of study, this book/disk combination includes tactile tutorials, as well as a section containing actual Novell questions and answers. Emphasizing the importance of learning how to look at things from the Novell perspective, Mueller and Williams also explain why a given answer is the correct one.

The disks that come with *The Novell CNA/CNE Study Guide* contain such helpful study tools as a sample exam based on the one given at Drake Testing Centers and a comprehensive Windows file-viewing utility readers can use to look up the questions, answers, and explanations they need to master a particular area of interest.

*The Novell CNA/CNE Study Guide* by John Paul Mueller and Robert A. Williams (ISBN 0-07-911904-2) costs \$38.95. This paperback book is 352 pages long and contains 180 illustrations. It is available in bookstores or from the publisher.

*Continued on Page 86*

AIX, Sun Solaris, HP MPE/iX, MS Windows, MS Windows NT, OS/2, and Macintosh platforms. Release 3.5 also includes a project management and problem tracking module.

Contact Diamond Optimum Systems, 22801 Ventura Blvd., Suite 105, Woodland Hills, California 91364, phone: (800) DOC.VCS.1 or (818) 224-2010, fax: (818) 224-2009, e-mail: DiamondOS@aol.com.

## 32-PPM Laser Printer

Ganson Engineering, Inc. has announced a 32 page-per-minute (PPM) laser printer with a 300,000 pages-per-month duty cycle.

Standard features include PCL5 printer emulation, Microsoft TrueImage PostScript with automatic switching of the active language, 8 MB of RAM expandable to 28 MB, indus-

try-standard SIMM support, and low energy consumption. Fonts include 35 TrueType outline fonts, 14 Laser II and III bit-mapped fonts, and 13 Scalable typefaces. The G32 also comes with 12 months of on-site maintenance.

G32 laser printer options include Duplex printing, high-capacity input feeder (2,000 sheets) and stacker (1,800 sheets), PostScript compatibility, direct-network connectivity for all computing platforms (i.e., IBM, DEC, Wang, HP, etc.), a hard disk drive for storing fonts and forms, and a 5- or 10-bin sorter/stacker unit.

The G32's introductory base price is \$9,950.

Contact Ganson Engineering, Inc., 18678 142nd Avenue NE, Woodinville, Washington 98072, phone: (206) 489-2090, fax: (206) 489-2088.



# MDL Corporation does it again!

HP9000/7XX Driver for the Seagate Elite 9GB disk drive

Other products  
manufactured  
by **MDL**  
include

**FAWS**  
Fast and Wide  
SCSI controller

**FANS**  
Fast and  
Narrow  
SCSI controller



**EISA BUS**  
Expansion Box

Full function  
Exabyte drivers  
for the HP-UX  
and Domain  
operating  
systems

Performance  
tuned drives

Now thanks to **MDL** you can run the **Seagate Elite 9<sup>®</sup>**, 5.25" 9GB formatted Fast SCSI 2 drives on your **HP System**. Think of the possibilities with a complete 9GB subsystem, drivers, tested and custom configured for optimal performance.

**Call MDL at (800) 800-3766**



Seagate and Elite are registered trademarks of Seagate Technology, Inc.

**Fax (206) 861-6767 Call TODAY**

## System Accounting Software

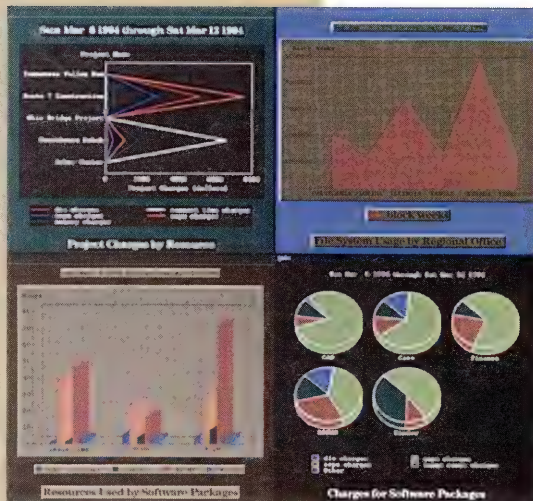
GEJAC, Inc. has announced ARSAP 4.0 resource management and chargeback software. It provides the systems administrator with usage accounting information and can be operated completely through one utility. The optional color graphics module produces files that can graphically display system resources within any parameter.

ARSAP 4.0 accounts for the use of system resources by user, project, section, or department on any multi-user system or workstation, and in any application. It supports an unlimited number of workstations, nodes, users, and projects in the NFS and Windows environments. Administrators can allocate system costs however they choose, and rates can be set for any resource by user, project, or node.

The application tracks connect (seat) time, CPU time, file space, logins, disk I/O, and other system resources. It displays resource management and chargeback information in bar charts, pie charts, area charts, and plots. Its graphics module produces files suitable for printing on PostScript, HP LaserJet, HP PaintJet, and IBM PP3812 printers, and it can create X Window dump files.

ARSAP 4.0 GUI operates across all major UNIX systems supporting X11 Release 5. The graphics module operates across HP-UX and other UNIX platforms.

Contact GEJAC, Inc., 8643 Cherry Lane, Laurel, Maryland 20707-6210, phone: (301) 725-2500, fax: (301) 725-7196, e-mail: info@gejac.com



GeJac, Inc. ARSAP 4.0

P7 protocol can be configured at startup to interface with all available 1988 X.400 P7 Message Store servers. Users on a LAN can connect to the Message Store from their desktop; remote users can

access the Message Store asynchronously via a modem. The product supports all P2 Heading fields, and supports X.435 (Pedi) Messages. The X.400 P3 protocol provides an alternative for interfacing to a 1984 mounted file system MTA.

EXM/EDI Enabler comes integrated with the EXM/UA and is priced from \$120 to \$450 per user agent, depending on quantity.

Contact Enterprise Solutions Limited, 2900 Townsgate Road, Suite 210, Westlake Village, California 91361, phone: (805) 449-4181, fax: (805) 449-4186.

Contact McGraw-Hill, Blue Ridge Summit, Pennsylvania 17294-0850, phone: (800) 822-8158.

## New from Enterprise Solutions

### Fax Server

Enterprise Solutions Limited (ESL) has announced a high-volume fax server for X.400 EXM Mail. EXM/FAX Server resides on the same server as the system or department X.400 message transfer agent and provides inbound and outbound fax delivery. There is virtually no limit to the number of simultaneous lines that can be in operation, using multiline boards and/or multiple slave units. These slave units can have up to eight multiline boards each.

Every user can have an individual phone number, with all faxes received by the central fax server and then routed to the individual mailbox. Alternatively, each electronic fax machine user can have a four-digit extension to the main

fax number, and incoming faxes can be routed from the fax server to the appropriate mailbox.

EXM/FAX enables administrative control of access restrictions, providing a table of telephone prefixes and a tariff table to differentiate destination zones, and allows fax messages to be submitted to a distribution list upon receipt by the server.

Pricing starts at \$10,000, with a single-line fax board.

### EDI Packages Interface

Enterprise Solutions also announced the EXM/EDI Enabler, which integrates EDI and EXM Mail in an X.400 platform. It is available with the EXM User Agent and requires only a single-user mailbox at a Message Store. Users can set specific parameters for the sending and receiving of EDI files.

EXM/EDI Enabler allows an EDI translation and Management Package to be incorporated into the desktop environment. The EXM/EDI Enabler

## Higher Education EIS

Datatel Incorporated has announced the TopView Executive Information Service, which gathers and displays summary information to help higher education executives and managers identify key business trends, data relationships, and exceptions. It is said to be the first EIS in higher education to retrieve and combine institutional information from multiple databases, including Datatel's Colleague and Benefactor products.

Enrollment management directors can segment the student population into groups based on specific characteristics and compare them against each other as well as against peer institutions, for example. Once users have reviewed summary information in colorful charts, graphs, and tables, they can drill down



to get a closer look at diverse and extensive details.

The TopView support package includes consulting, training, documentation, and response line support. Datatel and its clients together build a library of informative reports to be shared among all TopView users. Key industry reports are available in the four functional areas of Datatel's products: Alumni and Development, Financial, Human Resources, and Student.

Contact Datatel, Inc., 4375 Fair Lakes Court, Fairfax, Virginia 22033, phone: (703) 968-9000.

### Document Management

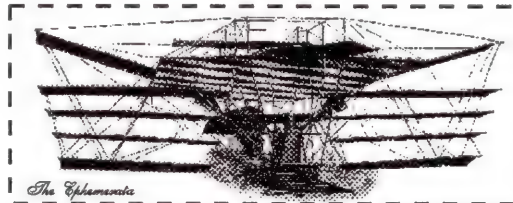
Documentum Inc. has announced Release 2.0 of the Documentum Enterprise Document Management System (EDMS). The new Virtual Document Manager (VDM) manages all the collaborative efforts involved in managing and assembling configurations of business-critical documents. Release 2.0 also includes expanded workflow capabilities for defining, initiating, and processing complex workflows. Documentum's Quickbuilder, a new screenpainter product, allows easy customization of the user environment.

The Documentum EDMS includes the Documentum Workspace, a graphical user environment; the Documentum Server, featuring a set of services for all information objects; and the Documentum Toolkit, a set of APIs for building custom solutions.

Through Adobe's Acrobat Exchange, Documentum has provided an annotations interface that allows approved users to view "sticky note" annotations associated with a document.

Release 2.0 of the Documentum Workspace is available on Microsoft

### "Flight 1894"



"Point & Shoot"  
GUI Report Writing

### "Reports 1984"

Defense Monthly			
Cat	Model	Yr	Price
F111	Tc	83	\$889
F14	TE	85	\$969
F117	Ta	84	\$999



F-117  
Stealth

Flight's Evolution

### The Evolution of Database Publishing

### DbPower-GUI

Report Writing & Data Base Publishing

XWindows, Motif  
HP-UX, AIX, Solaris 1.1, 2.3  
Unixware, IRIX, DC /OSx

Db-Tech, Inc.  
3300 Holcomb Bridge Rd.  
Norcross, GA 30092  
1-800-234-4500  
dbtech@america.net

### Defense Monthly



Aircraft	Model	Year	Price
Parade	Toucan	1989	\$182000
Parade	911	1986	\$182000
Lombard	Crusade	1991	\$190000
Parade	740	1992	\$200000



Cost Comparisons by Aircraft

CIRCLE 35 ON READER SERVICE CARD

## Job Scheduling

Operations Control System (OCS) has announced EXPRESS for UNIX 2.01 job scheduling software. EXPRESS Version 2.01 offers capabilities that increase UNIX system fault tolerance; improve scheduling efficiency for complex, interdependent production jobs; and deliver a new level of ease of use to systems administrators, computer operators, and end users.

EXPRESS for UNIX Version 2.01 provides two scheduling alternatives. The interprocess option enables multiple master schedules to be distributed across machines. The expanded runtime host option enables systems administrators to specify multiple workgroups of remote host machines for a single master schedule.

Version 2.01 makes it easy for end users as well as operators and administrators to gain access to their own customized reports. A new toolbar has been added to the EXPRESS production status window, enabling operators to easily filter out unnecessary information and narrow the window to view jobs on an exception-only basis.

EXPRESS command control can be placed at the group level, the job rule level, or at any combination of groups and rules, and GUI-based commands can be applied either to the entire groups or to individual job rule instances.

EXPRESS for UNIX 2.01 is available immediately on HP-UX, AIX, and Sun platforms. Pricing begins at \$5,000 and is based on system configuration.

Contact OCS, 560 San Antonio Road, Suite 106, Palo Alto, California 94306, phone: (415) 493-4122, fax: (415) 493-3393.

Windows and Macintosh and is scheduled for availability on Motif clients in the first quarter of 1995. Release 2.0 of the Documentum Server is available on Sun Solaris and HP-UX servers.

Pricing ranges from \$500 to \$1,500 per seat, depending on configuration and size of deployment.

Contact Documentum, Inc., 4683 Chabot Drive, Suite 102, Pleasanton, California 94588-2748, phone: (510) 463-6800, fax: (510) 463-6850.

## New from Computer Associates

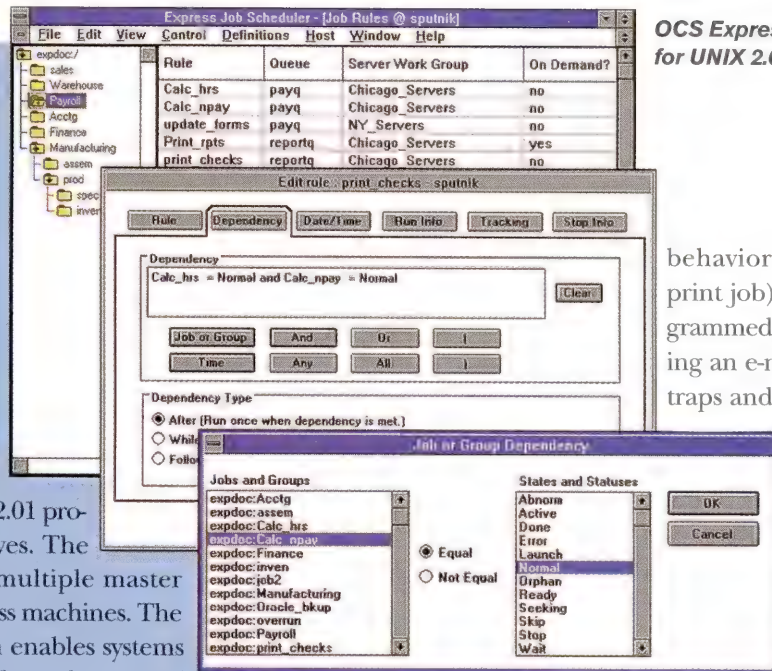
### Unicenter SNMP Support

Computer Associates has announced CA-Unicenter 1.1, which

offers SNMP support for integration with such popular network management platforms as HP OpenView, SunNet Manager, and NetView 6000. Release 1.1 adds significant new functionality to all of the integrated CA-Unicenter systems management disciplines including file backup, archive and automatic restores, help desk, security, job scheduling, report distribution, and event management.

CA-Unicenter events act like any other significant exceptional network event. Depending on user configuration, the network topology map blinks or changes color. As a registered network application, CA-Unicenter takes predefined actions affecting its own

## OCS Express for UNIX 2.01



behavior (such as rerouting a print job) or executes a preprogrammed sequence (such as issuing an e-mail). Receiving SNMP traps and a wide variety of non-SNMP events (such as those logged by the system), CA-Unicenter's event management facility can monitor and interpret the event before taking pre-

determined action.

CA-Unicenter 1.1 is available at no additional charge to clients with active maintenance contracts.

### Application Development

Computer Associates has begun shipping database drivers for its multiplatform application development product, CA-OpenROAD. Drivers include full, integrated support for CA-Ingres, Oracle, Microsoft SQL/Server, and Sybase databases.

Developers can now create new database-independent applications in the CA-OpenROAD environment or deploy existing CA-Windows 4GL applications against CA-Ingres, Oracle, Microsoft SQL/Server, and Sybase. The application is developed once and then deployed on different platforms against multiple databases without changes to the application itself.

CA has bundled these new database drivers as part of the CA-OpenROAD Success Pack, with pricing at \$420 per user for a 16-user license on Windows NT. In addition to the database drivers, the Success Pack includes the CA-Ingres/Net software that transparently ties PCs to servers, a pre-compiler, and a query and reporting tool for end users.

*Continued on Page 90*



# Interex '94 Conference Proceedings

The Conference Proceedings are a great way for HP users to capture all the information available at the conference. The proceedings from Interex '94 in Denver contain final paper presentations of all scheduled sessions. If you were unable to attend the conference, you can catch up on all the sessions you missed. All CSL/Site-level members who did not attend the conference automatically received a copy of the proceedings following the event, but additional copies are available.

Proceeding rates are as follows:

CSL/Site-level members additional copies	\$60
General-level members	\$60
Non-members	\$80

To receive the conference proceedings contact the Member Services Department at 800.INTEREX, or 408.747.0227.

**interex**

The International  
Association of  
Hewlett-Packard  
Computing Professionals

## Make the UNIX to MPE Connection!

# IX/92™

### Full Featured HP2392A Terminal Emulation

**File Transfer**  
**Serial and LAN connections**  
**Script Language**  
**X Windows Option**

**Available for:**  
**HP-UX**  
**SCO UNIX**  
**Interactive UNIX**  
**SunOS/Solaris**  
**SCO XENIX**

**New Option:**  
**NS/VT Access!**

*Software Licensing Corp. is a leader in the development of HP connectivity solutions. Our technology has been incorporated into well-known terminal emulation products in use throughout the world.*

**Software Licensing Corp., Suite 280, 930 Tahoe Blvd. Unit #802  
Incline Village, NV 89451-9436  
Phone: (702) 832-0881 Fax: (702) 832-0883**

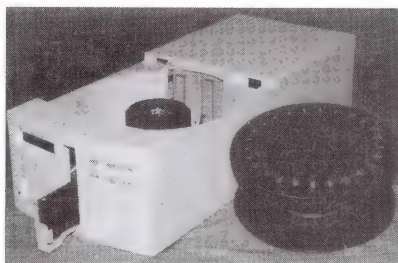
All trademarks are the property of their respective holders.

CIRCLE 33 ON READER SERVICE CARD

# FINALLY!

**200+ Gbytes Near OnLine Storage**  
**Up To 7 gigabyte/hour Saves**  
**3 Minute Restores**

**For under a nickel a megabyte**



**Introducing The StorageTek 9704  
DAT Tape Library System**

**Prices starting at \$9,500.00**

- 100 gb Uncompressed, 200gb Compressed Total Capacity  
- (25 Cartridges, 4 to 8 gb Each)
- Parallel Backup Speeds Up To, And In Some Cases Exceeding, 7 gigabytes/hour (Dual HP DDS2 drives)
- Three Minute Restores (with DallasTools Software)
- Interchangeable Carousels
- Mainframe Reliability  
- (drive MTBF 200,00 hrs, electrical MTBF 175,000 hrs, Picker MCBF 1,000,000 cycles)
- On Site Service Available By StorageTek
- Options:
  - Bar Coding
  - Mirroring (create 2 copies at once for on and off site storage)
  - DallasTools Unix, Novell, and DOS backup and archival software



**DALLASTONE**  
2 Cote Lane  
Bedford, NH 03110

**Phone 603-647-8168**  
**Fax 603-624-2466**  
**Email jjcarey@delphi.com**

CIRCLE 43 ON READER SERVICE CARD

### CD-ROM Recording System

Concorde Technologies, Inc. has introduced CD-Master for creating CD-ROM discs on UNIX systems. CD-Master consists of the Mastering Software, the Intelligent Controller, and the CD Recorder. It produces CDs with industry-standard file systems that are readable by any system that supports CD-ROMs. Through a graphical interface, users select, from either a local workstation or from across a network, data to be included on the CD being produced.

The Intelligent Controller contains an internal hard disk that stores the pre-mastered data. The CD-Master Intelligent Controller connects to the UNIX system through a SCSI interface, but it does not require a dedicated SCSI port; it can be daisy-chained with existing SCSI devices. While sending data to the CD Recorder, CD-Master can create UNIX system (UFS) discs for a complete backup of the UNIX system.

It provides complete POSIX file system support and conforms to ISO 9660. The Mastering Software uses either the Rock Ridge Extensions or Original Name Recovery.

Concorde's new CD-Master System product is available with a number of different CD recorders, priced from \$14,995 to \$39,995. The CD-Master System supports UNIX systems, including the HP 9000. No operating system kernel modifications are required.

Contact Concorde Technologies, Inc., 6370 Lusk Blvd., Suite F100, San Diego, California 92121, phone: (619) 458-0702, fax: (619) 458-0722

Contact Computer Associates International, Inc., One Computer Associates Plaza, Islandia, New York 11788-7000, phone: (516) 342-5224, fax: (516) 342-5329.

### Video Card

Parallax® Graphics has announced XVideo700, an EISA-based video card offering full-size, full-motion, true-color video for HP 9000 Series 700s. The included Video Development Environment is intended to help developers create applications that are interoperable with applications developed for Sun workstations.

XVideo700 lets users display, digitize, compress, and store video. The Video Development Environment provides an API, sample programs, and widget-based toolkit, as well as source code for MovieTool and VideoTool, applications for capturing and displaying still and motion images. These applications can be integrated with HP MPower 2.0, HP's collaborative multimedia product. XVideo700 includes a Universal Cable Kit for demonstrations and testing in a variety of system configurations.

The XVideo700 includes hardware-assisted motion JPEG compression and decompression. New features include the ability to display two live video streams simultaneously in two 640 × 480 resolution windows, S-VHS support, zoom to full screen, and analog output of the video window to a video projector, monitor, or VCR.

Parallax VideoStream technology supports simultaneous video windows and fast frame rates, making it especially suitable for performance-intensive applications like desktop videoconferencing and video-on-demand.

XVideo700 is available for \$7,485. Parallax offers comprehensive technical support and a one-year hardware warranty.

Contact Parallax Graphics, Inc., 2500 Condensa Street, Santa Clara, California 95051, phone: (408) 727-2220, fax: (408) 980-5139, e-mail: info@parallax.com.

### Connectivity Tools

Pericom Inc. has announced Version 3 of *teemtalk* for Microsoft Windows and

*teemX* for X Window-based UNIX/VMS. New features include additional emulations (ANSI BBS, Data General D410, IBM, 3151, Wyse 50/50+, 60); user-definable mouse button functions for integration with host applications; additional file transfer options via Zmodem and FTP; toolbar/floating button palette (*teemtalk* for Windows only); optional API compatible with IBM HLLAPI; and additional European language support for Swedish, Dutch, Danish, Finnish, Norwegian, Italian, French, and German.

These are in addition to the product's existing features: file transfer, scripting language, DDE (*teemtalk* for Windows only), hotspots, soft buttons, keyboard remapping, auto color mode, and connection templates.

The *teem* range provides multiple terminal emulations all in one, now supporting ANSI, DEC, IBM, Data General, Hewlett-Packard (HP2392A, HP2622A, HP700/92), Prime, Retrographics, Tandem, Tektronix, Viewdata, Westward, and Wyse.

Version 3.0 of *teemtalk* for Windows is priced from \$195. *teemX* is priced from \$499.

Contact Pericom Software Inc., 9 Princess Road, Suite D, Lawrenceville, New Jersey 08648, phone: (609) 895-0404, fax: (609) 895-0408.

### Warehouse Management

Catalyst USA, Inc. has announced the Catalyst Warehouse Management System (WMS) Version 5.0. The UNIX-based system provides full control over every facet of a warehousing operation: receipt, storage, replenishment, and all levels of picking and loading of a truck. The system manages everything from inventory to personnel and material handling equipment.

*Continued on Page 93*



# Sign up NOW for Fall 1995 Listings

## *hp-ux/resource directory*

The *hp-ux/resource directory* is a complete resource guide for HP-UX users seeking answers. This is one of the industry's most extensive reference guides for HP-UX products, services, and vendors. It will be devoted entirely to HP 9000 users operating in multi-user, workstation, and multi-system UNIX environments. This bi-annual directory, published each year in March and September, is a separate publication mailed out with *hp-ux/usr* magazine, the only HP-specific publication on the market.

Each company is listed by category, with each listing including company name, product, operating environment, and phone number. The cost for a full year listing in the *hp-ux/resource directory* is \$475. Discounts are available for current advertisers in *hp-ux/usr*, *Interact* or the *Vendor Service Source Directory*. Advertisers who run more than one listing per issue also receive a discount. There is a 75-word maximum per listing, with a charge of \$1.00 per word over the maximum.

The Fall 1995 *hp-ux/resource directory* will be published in **September** with **all listings due by May 5, 1995**. For further information contact Liana Fisher at the Interex Advertising Department 408.747.0227 or 800.468.3739. Fax: 408.747.0947. Written inquiries should be addressed: Liana Fisher, Interex, 1192 Borregas Avenue, P.O. Box 3439, Sunnyvale, California 94088-3439 U.S.A.

### PRODUCT CATEGORIES

Accounting	Government	Pointing Devices
Accounting Software	Graphics	Pre- and Post-Print Automation
Application Development Software	Hardware	Print Management
Application Development Tools/4GL	Hardware/Mass Storage	Process Control Software
Application Software Design	Hardware Subsystems	Project Management
Backup Hardware	Help Desk Management	Protocol Converters/Interfaces-Hardware
Backup Software	Hierarchical Storage Management	Publications
Bar Code Data Collection Systems	Human Resources and Personnel Systems	Purchasing
Batch Job Management	Image Processing	Quality Assurance Tools
Business Software	Image Storage and Retrieval Management	Records Management
CAD Software/Hardware	Industrial Terminals	Remote Control Software
Case Tools	Instrument Control	Rentals
Change Control	Integration Tools	Report Viewing, Printing, and Distribution
Change Management Tools	I/O Boards	Report Writers
Civil Engineering	Job Scheduling and Workload Management	Resource Management
Client-Server	Laser Printers	Sales and Marketing
Communications	Laser Printing Software	Scheduling
Communications Servers	Local Area Network (LAN)	Scheduling/Task Management
Communications Software	Mail Management and Marketing	Security
Consulting	Maintenance	SNA Communications
Consulting/Systems Integration	Manufacturing	Software
Customer Support/Help Desk Systems	Manufacturing Software	Software Development-Parametric
Database Management Systems	Mass Storage	Software Development Tools
Database Management Tools	Math Libraries	Software Maintenance and Testing
Data Center Management	Memory	Spoolers
Data Warehousing	Memory Upgrades	Statistics
Decision Support Systems	Migration Tools	Statistics/Data Analysis
Depot Repair/On-Site Management	Multimedia	System Integration
Desktop Publishing	Municipal Software	System Management
Disaster Recovery	Network Backup Software	Tape Backup Products
Disk Drives	Network Integration	Tape Storage
Distribution Software	Network Management	Tape Storage/Data Interchange
Document Management	Networking	Technical Documentation/Cross Referencing
Electronic Data Interchange (EDI)	Networking Systems	Telephone Management
Electronic Form Printing	Operating System	Terminal Emulation
Electronic Mail and Directory Integration	Payroll	Text Editors
End-User Computing	PC Integration	Time and Billing
Executive Information Systems	Performance	Time Reporting Terminals
Fax Automation	Performance Software	Training
Financial	Personal Information Manager	User Groups
Font Creation and Manipulation	Personnel Management	Utilities
Fourth Generation Language		Workstations
Full-Screen Editor		

**Other categories may be created as needed.  
See reverse side for listing form**

# hp-ux/resource directory

## FALL 1995 Listing Form

The Interex *hp-ux/resource directory* is published two times a year and mailed with *hp-ux/usr* magazine. The cost for a single listing in two issues is \$475. Each additional listing is \$375. Discounts are available for current advertisers in *hp-ux/usr*, *Interact*, or the *Vendor Service Source Directory*. For additional listings, please duplicate this form. The maximum number of words per listing is 75, excluding company name, address, product name, and operating environment. There is a charge of \$1.00 per additional word for each listing. The fall 1995 *hp-ux/resource directory* will be published in **September** with all listings due by May 5, 1995.



Spring 1995 *hp-ux/resource directory*

**Company logos** can be placed with listings. The cost is \$100, with discounts available for multiple listings. Maximum size is 3/4 inches high by 1-1/2 inches wide.

**Product photos** can now be placed with listings. The cost is \$100 per photo, with discounts available for multiple listings. There is a \$75 charge for changing photos between issues. Photos must be submitted in either 35mm slides, 4x5 transparencies, or up to 4x6 **GLOSSY** prints (black and white or color). The actual size the photo will appear in the publication is 2 3/16" wide and the height will be determined by the orientation of the original photo (horizontal or vertical).

(Please fill in all information completely—**ONLY** typewritten or clearly printed copy will be accepted)

Category \_\_\_\_\_

Product Name \_\_\_\_\_

Operating Environment \_\_\_\_\_

**Product Description** (MAXIMUM 75 WORDS) There is a \$1.00 per word charge for all listings over 75 words. If you need more space, please type or clearly print copy on a separate sheet and attach to this form.

Please return completed form to:

**Interex** ■ 1192 Borregas Avenue, P.O. Box 3439, Sunnyvale, CA 94088-3439, U.S.A.

**Phone** (408) 747-0227 or (800) 468-3739 ■ **Fax** (408) 747-0947

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone Number \_\_\_\_\_ Fax Number \_\_\_\_\_

Authorization \_\_\_\_\_

Signature/Date \_\_\_\_\_

Signature/Date \_\_\_\_\_

**Terms & Conditions of Sale:** All ads are under the terms Net 30 Days. Any balance over 30 days old will be charged 1.5% per month. Interex reserves the right to refuse advertisement in any of its publications to any delinquent advertisers.

**Cancellations Clause:** All cancellations must be made by the listing due date and must be followed in writing within 5 working days.

PAYMENT OR PURCHASE ORDER MUST ACCOMPANY ALL ORDERS





### RAID Subsystem

Dataram Corporation has announced the DTM4000 Series RAID subsystems. The DTM4000's significant performance boosts are a result of a new controller architecture, which delivers throughput capabilities of more than 3,000 I/Os per second. In addition to performance enhance-

ments, the PCI bus allows the DTM4000 to quickly

incorporate emerging interface technologies (such as Fast-20 and Fibre Channel).

The DTM4000 subsystems are based on a modular, flexible design. The DTM4000 provides selectable levels of fault tolerance and data availability with support for RAID levels 0, 1 (10), 3, and 5. DATARAID storage solutions feature an easy upgrade design and built-in technology migration path.

The DTM4000 is available in a pedestal configuration, which houses from 5 to 20 full-height 3.5-inch disk drives, or an industry-standard 19-inch rack mount configuration, which houses from 5 to 30 disk drives. The subsystem's overall storage capacity ranges from 10.5 to 128.7 GB, with either single or dual active controller configurations.

All components in the DTM4000 are customer-replaceable and hot-swappable while the unit is fully operational. Standard warranty on all subsystem hardware is five years.

Pricing on the DTM4000 subsystems starts at \$33,300 for single quantities. Quantity pricing is available upon request.

Contact Dataram Corporation, P.O. Box 7528, Princeton, New Jersey 08543-7528, phone: (800) DATARAM or (609) 799-0071, fax: (609) 799-6734.

The Catalyst WMS, available off-the-shelf, supports multilingual users and sites, allowing users to select a site language and as many user languages as required. Users interact with the system in their own language, and reports are generated in the site language.

Catalyst WMS Version 5.0 offers flow-through support, which is targeted to major retail-type operations that "push" a large portion of their merchandise out to their stores at time of receipt.

The catalyst system will assign stock rotation based on arrival date, date of manufacture, warehouse expiration date, consumer expiration date, and an incubation hold and release date. It also supports directions for materials to be placed and removed from hold and will prevent the picker from using material on hold. Version 5.0 supports multiple simultaneous holds.

Prices are based on the number of users and start at \$150,000, for 1 to 25 users.

Contact Catalyst USA, Inc., 8989 N. Deerwood Drive, Milwaukee, Wisconsin 53223, phone: (414) 377-9400 or (800) 236-4600, fax: (414) 377-6263.

### New from WRQ

#### Kanji PC X Server

WRQ has launched Reflection X, the first fully localized PC X server for the Japanese market. The product provides online help, all documentation, and the entire user interface in Kanji. Reflection X is a 32-bit application that gives PC users access to network applications based on the X protocol. Enhancements include fully localized user interface for Reflection X; fully localized user interface for Reflection FTP; network support for TCP/IP stacks popular in Japan;

support for Japanese NEC PC9800 and Epson (NEC-compatible) PCs; support for copying and pasting Japanese characters between Reflection X and other Windows applications; and X server support for double-byte fonts.

Reflection X is available in Japan through Cybernet Systems in Tokyo (phone: 81 3 5978 5410, fax: 81 3 5978 5440) or by contacting WRQ corporate headquarters.

#### TCP Connectivity

WRQ has announced the Reflection Suite for TCP, said to be the only TCP/IP product that combines the performance benefits of VxDs with the reliability of DLLs. The Reflection Suite for TCP includes all standard communications protocols (TCP, UDP, IPX, LAT, SLIP, and CSLIP) and works with standard wireless protocols—circuit-switched cellular (CSC) and cellular digital packet data (CDPD).

The Reflection Suite for TCP includes Reflection 2 for Windows for

VT320 (telnet) connectivity, RTP client, FTP server, graphical Ping, Finger, and LPR/LPD printing services. WRQ's TCP connection is 100 percent Winsock-compliant. The suite will run any application written for VT320, VT220, VT102, and VT52 terminals. Point-and-click graphical keyboard mapping makes it easy to reconfigure the user interface. Support for dynamic data exchange (DDE) lets users exchange information between host and PC applications. Fonts rescale proportionally when the user resizes a window, and users can customize up to 40 buttons on a palette. Reflection supports international character sets.

The Reflection Suite for TCP is priced at \$399 for a single-user copy. Volume and site license pricing are also available. The Reflection Suite for TCP is available directly from WRQ or from a worldwide network of distributors, resellers, and VARs.

Contact WRQ, 1500 Dexter Avenue North, Seattle, Washington 98109, phone: (800) 872-2829 or (206) 217-7100.

# Membership Levels and Service Package

The International  
Association of  
Hewlett-Packard  
Computing  
Professionals

## Membership Levels

■ **associate level** includes the following services/benefits:

- **Subscription to either:**  
*hp•ux/usr* magazine - includes companion Product Directory  
*Interact* magazine - includes companion Product Directory
- Member rates for Interex Conferences
- Read-only access to Interex Online library
- Membership in your local Regional User Group (RUG) at RUG membership rate

■ **contributing level** includes the following services/benefits:

- **Subscription to BOTH:**  
*hp•ux/usr* magazine - includes companion Product Directory  
*Interact* magazine - includes companion Product Directory
- Subscription to *InterexPress*, monthly news publication
- E-Mail account through Interex (includes read-only access to Interex Online library)
- Access to Special Interest Groups (SIGs)
- Member rates for Interex Conferences
- Membership in your Regional User Group (RUG) at RUG membership rate
- Voting Privileges for Board Elections and Advocacy Surveys  
(i.e., system improvement surveys)

## Service Package

■ **online service package** includes ALL the benefits of Contributing Level plus:

- **Software Access**—unlimited downloads from entire library of HP-UX, MPE, and RTE programs (containing over 4,800 programs). Includes one free tape of current Interex Annual Release in the operating system of your choice. Custom tapes from software library are also available.
- **Information Access**—full text search and downloading capabilities for all Interex publications including: *hp-ux/usr*, *Interact*, Vendor Resource Directories, product news and announcements, and Conference Proceedings abstracts.
- **Member Access**—member directory. Find members with similar interests. Plus access to the *Who's Who* guide of Interex staff, volunteers, and HP liaisons.

*Online services are continually upgraded and modified; services are subject to change without notice.*



# I'd Like to Join Interex

## Order Form

Choose one of the following

### ■ membership levels & service package

- ☐ Associate Level, \$49.50\*
- ☐ Contributing Level, \$115.00\*
- ☐ Contributing Level Plus Online Package \$595.00\*

All membership and service packages are based on an annual fee.

Package subscribers, please choose the following:

### ■ preferred software format and operating system for the annual tape release

- ☐ 1600 BPI Magnetic Tape
- ☐ 6250 Magnetic Tape
- ☐ Linus Cartridge Tape (CS-80)
- ☐ DAT 4mm

(Check one of the following)

- ☐ HP-UX ☐ MPE/iX ☐ MPE V ☐ RTE

**Please read and sign the following disclaimer:** I am applying for services with Interex. I understand that no funds will be returned after any Contributed Software Library (CSL) tapes/disks have been shipped or downloaded from Interex. I agree not to distribute software to any unauthorized users or use software received through Interex on more than one system at a time. I understand that this agreement stays in force even after my services expire or are terminated.

*Contact the Membership Department for pricing of the Right-to-Copy License for multiple machine usage*

Signature \_\_\_\_\_

Date \_\_\_\_/\_\_\_\_/\_\_\_\_

### ■ member directory

Please include me in the member directory.

- ☐ Yes ☐ No Please initial: \_\_\_\_\_

### ■ service agreement

If you relocate, should services transfer with you?

- ☐ Yes ☐ No Please initial: \_\_\_\_\_

### ■ mailing list

Would you like to receive mailings about other computer-related vendors' products and services? ☐ Yes ☐ No

### ■ mailing address

(attach business card here)

name \_\_\_\_\_

job title \_\_\_\_\_

company \_\_\_\_\_

address \_\_\_\_\_

city/state/zip \_\_\_\_\_

country \_\_\_\_\_

telephone/extension \_\_\_\_\_

fax \_\_\_\_\_

e-mail \_\_\_\_\_

### ■ billing address (if different from mailing address)

name \_\_\_\_\_

company \_\_\_\_\_

address \_\_\_\_\_

city/state/zip \_\_\_\_\_

country \_\_\_\_\_

### ■ payment options

- ☐ Bill me ☐ Check enclosed, payable to Interex
- ☐ Purchase order enclosed, PO# \_\_\_\_\_  
(purchase order accepted for invoicing purposes only)
- ☐ Please charge my: ☐ Visa ☐ MasterCard ☐ AmEx

credit card number / expiration date \_\_\_\_\_

signature \_\_\_\_\_

Total payment enclosed \$ \_\_\_\_\_

Foreign currency accepted BUT payment must be equivalent of U.S. currency. Each publication has an annual subscription value of \$49.50.

**NOTE:** Services do not begin until payment is received.

\*Canada & Mexico add \$25 and all other countries outside the U.S. add \$50 for additional postage.

### ■ send form and payment to:

Interex, P.O. Box 3439,  
Sunnyvale, CA 94088-3439, USA;

**fax** 408 747-0947

**phone:** 800.INTEREX, 408.747.0227, **fax:** 408.747.0947

**e-mail:** membership@interex.org

**CompuServe:** 76376, 1222

**World Wide Web:** <http://www.interex.org>

# Advertiser's Index

Please call or fill out adjacent card for further product information.

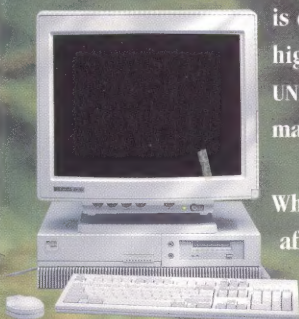
READER SERVICE NUMBER	ADVERTISER	PAGE #
52	<b>Abtech</b> ..... (800) 474-7397	27
61	<b>Brixton Systems</b> ..... (800) BRIXTON	25
45	<b>Camintonn/Z-Ram</b> ..... (800) 368-4726	C-2
150	<b>Computer Marketing International</b> ..... (800) 497-4264/Fax: (508) 689-2031	75
55	<b>Concorde Technologies</b> ..... (800) 359-0282/Fax: (619) 458-0722	59
140	<b>C.S.U. Industries, Inc.</b> ..... (516) 239-4310/Fax: (516) 239-8374	49
35	<b>Db-TECH</b> ..... (800) 234-4500	87
43	<b>Dallastone</b> ..... (603) 647-8168	89
51	<b>Data Assurance</b> ..... (800) 654-1689	51
34	<b>Design 3000 Plus, Inc.</b> ..... (503) 585-0512/ Fax: (503) 585-1706	41
121	<b>Diamond Optimum Systems, Inc.</b> ..... (818) 224-2010 or (800) 362-8271	35
24	<b>Digital Controls</b> ..... (800) 274-1627	69
31	<b>Eagle Software</b> ..... (800) 477-5432	55
105	<b>I/O Data Systems, Inc.</b> ..... (216) 835-2211/Fax: (216) 835-0220	29
96	<b>IEM, Inc.</b> ..... (970) 221-3005 or (800) 321-4671/ or /e-mail: info@iem.com	9
92	<b>ITAC Systems, Inc. - Mouse-Trak</b> ..... (214) 494-3073/Fax: (214) 494-4159	5
114	<b>International User Conference</b> ..... 011 49 711 976 7114, Fax: 011 49 711 976 7116	65
146	<b>Interworks '95</b> ..... (508) 436-4460	53
170	<b>MDL</b> ..... (800) 800-3766	85

READER SERVICE NUMBER	ADVERTISER	PAGE #
47	<b>Monterey Bay Communications</b> ..... (408) 429-6144/Fax: (408) 429-1918	1
85	<b>Newport Digital Corporation</b> ..... (800) 383-3642/Fax: (714) 730-3951	13
26	<b>ORBIT Software</b> ..... (800) 6-Online or (510) 837-4143	31
95	<b>Pericom, Inc.</b> ..... (609) 895-0404/Fax: (609) 895-0408	39
13	<b>Platinum Technology</b> ..... (800) 492-7528	83
54	<b>Qualix Group</b> ..... (415) 572-0200	15
152	<b>RAC Consulting</b> ..... (206) 357-9572/Fax: (206) 352-8453	17
4	<b>Robelle Consulting Ltd.</b> ..... (604) 582-1700/Fax: (604) 582-1799	29
33	<b>Software Licensing Corp.</b> ..... (702) 832-0881	89
143	<b>Technical &amp; Scientific Application</b> ..... (800) 422-4872/Fax: (713) 935-1555	73
49	<b>Ted Dasher &amp; Associates</b> ..... (800) 638-4833/Fax: (205) 591-1108	69
135	<b>Telamon</b> ..... (916) 622-0630/Fax: (916) 622-0738	79
27	<b>Transitional Technology</b> ..... (800) 874-8325	3
42	<b>TriTeal Corp.</b> ..... (800) 874-8325	2
53	<b>Tryonics</b> ..... (800) 551-6236	C-3
40	<b>VESOFT, Inc.</b> ..... (310) 282-0420/ Fax: (310) 785-9566	75
39	<b>Workstation Solution</b> ..... (612) 449-9000	79
	<b>Walker Richer &amp; Quinn, Inc.</b> .....	Back Cover
	(800)92-NETWORK	



# Renewable Resources

You wouldn't let a good thing go to waste. And neither would we. That's why Tryonics is dedicated to bringing you the highest-quality remanufactured UNIX workstations on the market today.



Whether you're looking for affordable workstations to add to your current environment —

or looking to offload excess, rarely used, or old equipment — we can help. Tryonics can even help you efficiently market and dispose of your surplus equipment.

Tryonics, the leader in workstation remanufacturing and Asset Management Services, can bring you the best return on your investment. If you're selling excess equipment, we'll help you get the maximum return. And if the equipment has to be discarded, we'll ensure that it's done properly. Because we're committed to using environmentally friendly processes to recycle more than 99% of returned equipment into usable parts and products. Renew, reuse, recycle. With Tryonics.

Deal with the best — Tryonics.  
Call us at 800 551-6236.



**Tryonics**



A man is lying in a white hammock strung between two palm trees on a sandy beach. The background shows the ocean with a small sailboat and distant mountains under a clear sky. Lush green foliage is in the foreground. A white rectangular box with a thin black border is overlaid on the left side of the image, containing the text 'MONDAYS, AS DESIGNED BY NETWORK PROFESSIONALS.' in a serif font. The text is centered within the box and flanked by horizontal lines.

MONDAYS,  
AS DESIGNED BY  
NETWORK PROFESSIONALS.

ENTERPRISE-WIDE  
CONNECTIVITY, AS DESIGNED  
BY NETWORK PROFESSIONALS.



Reflection  
TCP/IP

REFLECTION PC-TO-HOST CONNECTIVITY SOFTWARE

- REFLECTION NETWORKING SOFTWARE

- AVAILABLE AS SUITES AND INDIVIDUAL PRODUCTS, TAILORED  
FOR ANY ENTERPRISE CONFIGURATION.

For a FREE evaluation copy, call  
800.926.3896



WRQ Reflection  
CONNECTIVITY FOR A CHANGING WORLD

CALL 800.926.3896. IN EUROPE, CALL +31.70.375.11.00.  
OUTSIDE EUROPE, CALL 206.217.7100. INTERNET: SALES@WRQ.COM

WALKER RICHIE & QUINN, INC. / 1500 DEXTER AVENUE NORTH, SEATTLE, WASHINGTON 98109 USA  
 BUTTENHOF 47, 251 31 AM HOG, THE NETHERLANDS / FAX: +31-70-356 12 44  
 FAX: +49-217-0295 90  
 L'EDDIE, BP 10910, RUE DE LA VILLE 97311 ROISSY COX CEDEX  
 FRANCE / FAX: +33-1-49 12 21 16  
 WRQ AND REFLECTION ARE REGISTERED TRADEMARKS OF WALKER  
 RICHIE & QUINN. ALL OTHER TRADEMARKS ARE THE PROPERTY OF THEIR RESPECTIVE OWNERS.